APR 3 1922

Railway Age

FIRST HALF OF 1922—No. 13 NEW YORK—APRIL 1, 1922—CHICAGO SIXTY-SEVENTH YEAR

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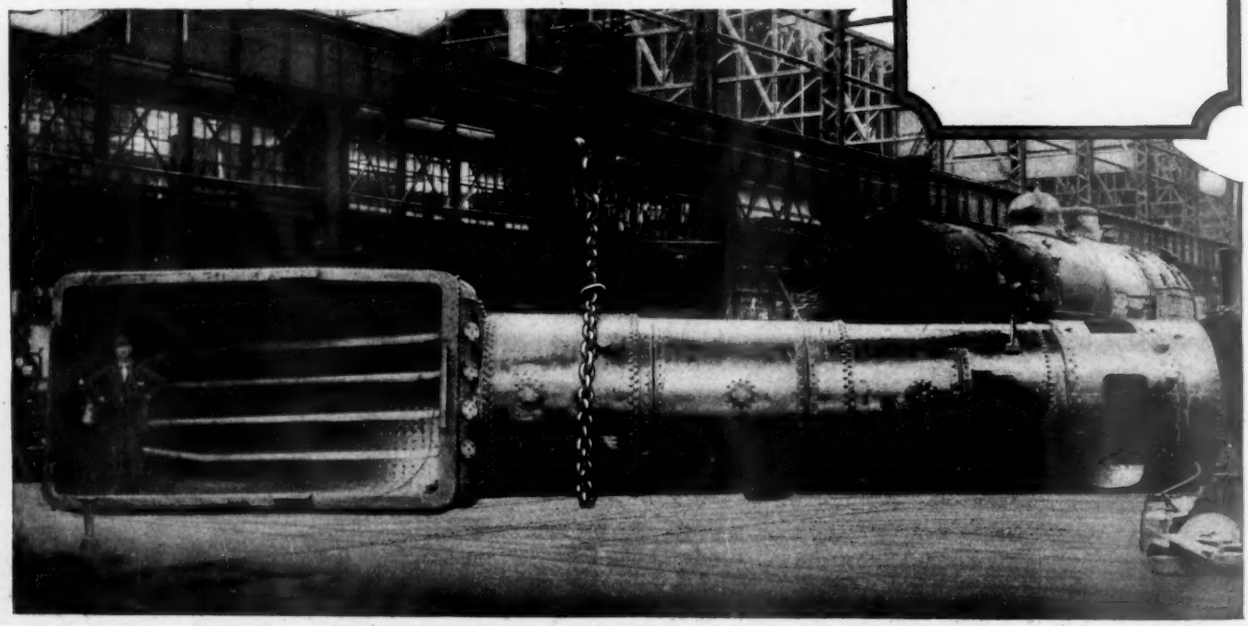

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EDITORIAL

Railway Age

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Show the Boss

Which is more effective, a written story or one enacted before our eyes as in moving pictures, for example? Doubtless the latter, for conditions or events actually seen make a much stronger impression than those we only read of or hear about. In a general way railroad men admit that the present lack of adequate, modern machinery and labor-saving devices in most repair shops and enginehouses limits output and increases unit repair costs. The men who most fully realize the needs, however, are the shop or roundhouse foremen on the job who must get results with limited equipment. These men can see with their own eyes how worn-out machines are increasing shop costs and when possible they should get the higher mechanical department and executive officers out into the shops so that they too can see and better visualize the needs. If this impression is backed up by accurate, comprehensive figures proving that new machinery will make a net return of over 12 per cent (as it often does) on the investment, the necessary capital will be forthcoming. Present inadequate facilities in the way of shop machinery and equipment are taken too much for granted. It is a serious question if the lack of capital for necessary improvements is not also taken too much for granted. The mechanical department in its request for better shop and enginehouse facilities has a good case which should be presented forcefully and continuously to the highest authority. Show the boss.

A Broad View of Locomotive Improvements

The criticism is sometimes made and, we fear, with more or less truth, that motive power officers are not keen in the search after improvements in details of locomotive equipment and at times even oppose the application of devices of proved value. This attitude appears at first to be somewhat difficult to explain as these are the very men from whom new and advanced ideas should normally be expected. Natural conservatism, developed from constant contact with mechanism that is at least doing the work, does not offer a sufficient explanation. The real reason will, we think, be found in the character of the railroad organization and the relationship of responsibility and credit between the mechanical and the operating departments. Motive power officers are too prone to note that any savings which result from the adoption of improved attachments are reflected in reduced costs of operation and that the credit for such gains goes to the operating department. At the same time every motive power officer knows that each added device increases somewhat the cost of inspection and maintenance which is entered on the books as a charge against his department without any offsetting credit. The majority of locomotive shops and terminals are already taxed to so near their maximum capacity that it is not surprising that every little additional burden is feared lest it prove to be the last straw to break the camel's back. There is unquestionably a pressing need for increased shop facilities to enable railroads to obtain a fuller degree of service from the locomotives which they already have. However, neither lack of shop facilities nor the fact that a saving obtained is credited on the accounts to some other department should blind the eyes of an officer to the benefits that can be obtained from various improvements. In such matters the outlook must be a broad one and reach beyond departmental lines.

Let's Get Acquainted

From now on, we are informed, it will be a matter of but slight difficulty to strike up an acquaintanceship with the passenger train engineers on the St. Louis-San Francisco. This opportunity has been brought about by the recent decision of the Frisco management to feature the name of each passenger engineer who has a regular run, in gold leaf on a black enameled glass plate background, which will be located prominently on the cab of his engine; the name plate to be a sliding device which may be removed from its holder at the end of a run. In the main, this novel idea is conceived as a means of establishing closer personal relations between the road in question and the general public. It should have practically the same effect, we believe, as the numbering of athletic contestants in college games for the benefit of the spectators. In both cases this gives the public a chance to come in more intimate contact with those who are "playing the game." Besides, there is a certain pleasing and psychological aspect to an arrangement of this kind which is particularly attractive to human nature. It is said that the 130 engineers, who are to have their names thus emblazoned to the world, have expressed keen gratification at the announcement, and there is no doubt but that the plan will be welcomed by the public. This is a step towards "Positive Public Relations Works," along lines advocated in an editorial by that title in the March 18 issue of the *Railway Age*.

Foreign Jobs for American Railway Men

If a young British railway man tires of his country and seeks foreign service for a change, he has every opportunity for gratifying his desires. Especially if he has a technical education and is otherwise fitted it is possible for him to secure some kind of official position on a British colonial railway or a British owned road in some foreign country. This is only one of the advantages accruing to the people of Britain out of their ownership and operation of colonial and foreign railways. When American money goes into foreign railway construction it generally goes in the form of a loan to an established line already operated by foreigners. When British money goes into foreign railways, generally speaking, British railway men go with it to build the roads and operate them. American railway men are interested in foreign railways. The many inquiring letters which come to the *Railway Age* prove that to us. We have pointed out previously in these columns that most foreign countries could learn more from American railway practices than from those of western Europe. One of the best ways to give these countries the benefit of our experience is to send Americans to help them operate their railways. When we lend money to foreign countries for railway expansion, it is unfair to our manufacturers of rail-

way equipment and supplies and to our railway men who seek foreign experience that such loans should not be conditioned upon the purchase of some of the needed equipment in this country and the employment of American railway men.

Railroads and Foreign Trade

The National Foreign Trade Council is planning to hold a convention called the Ninth National Foreign Trade Convention at Philadelphia on May 10, 11 and 12. One looks in vain in the program of the convention for any reference to railroads and their relation to foreign trade either as regards the interest that railroads in the United States may take in encouraging export trade or as regards the importance of our enormous exports in railroad supplies. The *Railway Age* believes that the relation of railroads to foreign trade should be given further attention. One bears in mind, for instance, that the railroads of this country are greatly interested in any traffic that they may be able to secure for carriage to the ports. This matter has been given special consideration because of President Harding's recent address to Congress with reference to ship subsidies. Reference may also be made to the report prepared under the direction of the United States Shipping Board in which it was said:

> The railroad systems of the United States feel the need of definite import and export working agreements with steamships engaged in foreign trade. . . . It would seem expedient and wise to permit reasonable working agreements to exist between the railroads and steamships. . . . The problem is fully and completely co-ordinating our rail and water transportation and is acute and important.

This report and President Harding's address have already borne fruit because the ship subsidy bill recently introduced proposes an amendment to the Panama Canal Act which will allow railroads to own vessels engaged in other than coastwise traffic or traffic through the Panama Canal or across the Great Lakes. The President and the Shipping Board have thus evidenced their interest in the relationships of the railroads with our foreign trade. Does it not appear strange that the Foreign Trade Convention, which is supposed to be held in the interests of the leaders in our country's export trade, should have failed to do likewise?

Two Ways of Attacking the Rail Problem

ALTHOUGH THE RAIL PROBLEM has been prominently before railway men and steel manufacturers for more than 10 years and although it has received continuous attention from both groups during this time, the progress which has been made has fallen far short of the objective. Work on behalf of the railways has centered in the Rail Committee of the American Railway Association, under whose direction a metallurgist has given his full time to research for several years.

In planning its line of action, the committee has had open to it two courses. On the one hand, as the representative of the consumers it could prepare specifications independently of the producers which, according to the best information available, would eliminate those influences in mill practice which have proven detrimental to the rails, with only secondary consideration to the manufacturing problems involved and submit these specifications to the steel companies for adoption. The alternative would contemplate the co-operation of the representatives of the roads and the manufacturers in the development of a specification which would involve certain concessions from the ideal conditions sought by the railways but which would be acceptable to the producers. Until recently the committee has chosen the first plan and has concentrated its attention on the preparation of specifications which represented the best obtainable practice in the opinion of the committee. These specifications have been accepted by the mills only with the payment of a premium so high as to be prohibitive. The result has been that the specifications have been non-existent as far as the rollings of rails is concerned.

More recently certain influences on the committee have advocated the other course, as a result of which a revised specification has been prepared which, while not yet approved by the Rail Committee, has been accepted by the manufacturers who have agreed to roll some rails under it this year without additional charge. While this specification falls short of some of the objectives of the committee, it represents a step in advance of existing specifications in others. As such it offers the possibility of a step forward in the solution of the rail problem in that it makes possible the production of rails in which certain objectionable characteristics now existing are expected to be eliminated.

The rail which will be rolled under this specification will be subjected to intensive scrutiny both in the mills and in the track to determine the effect of the changes in the specifications upon the service rendered with a view to determining upon such further revisions in the specifications as may be necessary before issuing them finally.

Are the Roads Ready for a Car Pool?

THE NATIONAL Association of Owners of Railroad Securities has proposed a comprehensive plan for the pooling of freight cars which includes not only the central control of the distribution of equipment but proposes to relieve the railroads of individual responsibility for the design of new equipment as well as for all maintenance except running repairs. In a communication appearing in this issue a transportation officer, in discussing some phases of this plan, takes exception to our comment which appeared on page 508 of the March 4 issue, on the ground that it did not discuss the feasibility of the plan itself but was confined to its incidental features.

It is true that in that editorial no attempt was made to discuss the practicability of the plan in detail. But an analysis of the estimated savings set forth by the sponsors of the plan indicates a lack of conservatism which, although not conclusive, does cast some suspicion on the claims of the sponsors to speak with authority on other phases of the subject. Probably no one will question the need for reform in many of the elements affecting the character and cost of car service. It is doubtful, however, whether all will agree that a revolutionary change such as is implied in a complete car pool is likely to produce better or quicker results than may be effected by placing the present system on an economically sound basis. It may be accepted as fundamental that the willing acceptance of a sweeping equipment pool, such as that proposed by the Security Owners' Association, by all the parties affected, including railway executives as well as transportation and mechanical department officers, must be preceded by a thorough understanding of all of the possibilities of such a plan as well as the reasons why satisfactory results are not now obtained.

With a general understanding of these facts it is quite possible that by far the greater part of the results to be obtained from the car pool might be effected with no change in the system of car ownership or distribution. At the present time, however, it is of less moment by what means the best results ultimately may be obtained than it is that a thorough appreciation of all of the factors which enter into the cost and character of car service may be obtained by everyone who exercises control over any of these factors. To that end the *Railway Age* will welcome the comments of its readers on this much discussed but still controversial question.

Mr. Jewell Starts a Revolution

B. M. JEWELL, in opening the case of the railway shop crafts in the wage hearings before the Labor Board this week, practically abandoned the case and started trying to revolutionize the entire industry of the United States.

Representatives of the railways have introduced statements and exhibits showing that employees in railroad shops are being paid wages much higher in proportion to the cost of living than before the war, and also higher than those of men doing comparable work in other industries. Mr. Jewell made a general denial; but, tacitly admitting that shopmen's wages are higher than those of men in other industries, he attacked the entire existing industrial system and the wages of all workers. "We come here," he said, "to challenge the justice of the wage rates of all productive labor; to challenge the very principle (cost of living and comparison with wages in other industries) upon which the railroads propose that rates of pay be adjusted. We propose to show how the entire purpose for which industry is operated can and must be changed."

Mr. Jewell contended that an industry which cannot pay an employee a wage sufficient to maintain an "average family of five" according to a "healthful standard of living" is as truly bankrupt as if it could not pay its fixed charges. He introduced a budget to show that to thus maintain a family of five requires $2,637 a year. "To secure what this budget provides," he said, "the railway mechanics must earn 40 per cent more than they are now being paid by the railroads." Other shop employees, especially helpers, would have to be given still greater increases. Labor leaders in other arbitrations have contended that the minimum income required properly to maintain a "family of five" is $2,260. Mr. Jewell is more advanced.

His conclusion as to the wage that should be paid is based not upon the productive efficiency of the average railway shop employee, but upon the needs of a family of five. But one family of five has needs as great as another. Therefore, on his theory, each railway employee of every class should be paid an average of $2,637. There are at present about 1,700,000 railway employees. An average wage of $2,637 for all would make the railway payroll over four billion five hundred million dollars a year, or about one billion seven hundred million dollars more than in 1921. If the railways had had this payroll in 1921, and all other expenses had been the same, their expenses and taxes would have exceeded their earnings by about one billion dollars—they would not have had a cent for fixed charges. Under normal business conditions the railways have about two million employees. The average wage advocated by Mr. Jewell would make the normal payroll about five billion two hundred seventy-five million dollars, or almost equal to their total earnings in 1921.

The net operating income of the railways in 1921 was only six hundred and fifteen million dollars. Where, then, does Mr. Jewell expect the railways to get the additional money with which to pay these higher wages? He intimates where he thinks part of it could be gotten. It has recently become the practice of railway labor leaders to charge that the railways and the concerns from which they buy coal, equipment and supplies are under the same financial control; that in consequence the railways pay excessive prices for these things, with the result that the concerns from which they buy them make excessive profits. They urge that if the railways would pay lower prices they could pay higher wages.

Mr. Jewell evidently intends to use this theory in the present case. He calls the "steel corporations, equipment and other supply companies" the "profit making part of the railroad industry" and says that these concerns, including the coal and coke companies, "piled up" surpluses during the years 1916 to 1920 aggregating about one billion three hundred million dollars.

In the first place, however, a large part of these surpluses has been wiped out by losses in the present business depression. In the second place, is it not possible the employees of the coal, equipment and supply companies may say that pluses of these companies, their own employees, and not if any group of workers has claims upon the profits or surpluses of these companies, their own employees, and not those of the railways, have these claims? Most of their employees are not being paid as much as railway employees. The wages of railway employees have within recent years absorbed most of the profits formerly made by the railroads. On what ground does Mr. Jewell base his theory that railway wages should in the future absorb also the profits of the coal mining, and equipment and supply industries?

However, Mr. Jewell generously constitutes himself the spokesman of all productive labor, and proposes an average wage for all of $2,637 a year. We look forward with great interest to whatever exposition he may make of the source from which this large average wage is to be derived. We should be most glad to see every worker in the United States receive even more than the wage Mr. Jewell mentions. But the industry of the country cannot meet the payroll that would result without a vast increase of production. The statistics of the census show that there are about forty-two million persons "gainfully employed" in this country. To provide them the average income, Mr. Jewell suggests would require an aggregate annual production of one hundred and eleven billion dollars.

The most complete and authoritative investigation of the production and income of the people of the United States ever made is that recently conducted under the auspices of the National Bureau of Economic Research, the results of which have been published in a book entitled "The Income in the United States." This shows that the total production and income of our people reached its maximum in 1919 when it was sixty-six billion dollars. This was measured in the high prices prevalent at that time. Equated on the basis of the prices of 1913, the production and income of the country reached their maximum in 1917 when they were forty-one billion dollars. Therefore, on the basis of the prices of 1919, Mr. Jewell proposes a payroll for industry exceeding by forty-five billion dollars, the largest total production ever attained, and on the basis of the prices of 1913 a payroll exceeding by seventy billion dollars, or 170 per cent, the largest production ever attained.

It is hardly necessary to say that the adoption of Mr. Jewell's wage scale would speedily result in the profits of all industry being absorbed by the payroll. But this does not daunt him. He says his plan of industrial revolution "frankly contemplates a situation in which temporarily they (profits) may have to cease." He adds: "Until that situation has been accepted, the conflict between capital and labor will continue."

Mr. Jewell and other labor leaders who assume the same general attitude, jauntily ignore vital facts. First, they ignore the fact that an enormous increase in production would have to be secured before any such average wage as they suggest could be paid. At the same time, they use all the power of their organizations to secure the adoption and perpetuation of hours of work and working rules and methods which help prevent the very increases in production which are essential to make possible the payment of the high wages they demand. Second, they disregard the fact that the "average family" in this country is not a family of five. The records of the census show that the average family contains 4.3 persons. Third, they usually disregard the fact that the average family is not supported by the earnings of one person. The number of families in the country is about 24,200,000. Since the number of persons "gainfully em-

ployed" is forty-two millions, it follows that the average family enjoys the income of one and three-fourths persons, and not of one person. Therefore, if each person gainfully employed had an income of $2,637, the income of the average family would be $4,600 a year, not $2,637, and would therefore be much larger than Mr. Jewell says it needs! It would require an average income per worker of only $1,510 to give the average family an income of $2,637.

Mr. Jewell may answer, his figures show the average railway shop employee's family has five members and only one person earning income. If that is true, then the average shop employee's family is larger than, and has only a little over one-half as many income producers as, the average American family. But if railway shop employees choose to have larger families than the average, and fewer of the members of their families elect to work, is that any reason why they should be paid higher wages than other workers?

Mr. Jewell's argument might be listened to with respect in a socialist convention where neither law, facts nor logic are admitted. It has no bearing on any question pending before the Railroad Labor Board. The Board is required to fix reasonable wages for railway employees, measured by certain standards specifically mentioned in the Transportation Act. The most important of these standards are the cost of living and the wages paid for comparable work in other industries. The law takes no account of the fact that a railway mechanic's family may be larger or contain fewer workers than the family of a mechanic employed in a factory. It does not contemplate that the Railway Labor Board shall award wages exceeding on the average those which any industry ever did pay or could pay under present conditions.

Mr. Jewell's presentation will do his followers no good in the present case. It will help to disseminate false ideas and aggravate unrest among working people. It will also, let us hope, make clear to the farmers and business men of the United States that the attacks of radical railroad labor leaders are not directed merely against reasonable profits and private management in the railroad business, but against reasonable profits and private management in every business. The adoption of Mr. Jewell's program would wipe out profits in every business and leave all private property valueless in the hands of its owners.

The Battle of the Brakes

FOR THE OLDER railroad man the expression "the battle of the brakes" will at once arouse memories of the epoch making Burlington brake tests of 1886 and 1887, the intensely interesting reports and discussions at the Master Car Builders' conventions of that period and the air brake developments which took place soon after. The 1886 tests sounded the death knell of all forms of brakes except those of the compressed air or vacuum types. The tests made during the following year were marked by the advent of electrical control of both compressed air and vacuum brakes and conclusively demonstrated that the use of power brakes for controlling long freight trains would be feasible only when such brakes were caused to apply instantaneously by electricity or by a very rapid serial action. At the close of the tests it appeared that the aid of electricity would be necessary and the committee in charge of the tests so reported. Before many months had elapsed, however, improvements in the quick-action triple valve caused electrical brake control to be abandoned for the time being. Another matter that should not be overlooked is the fact that these tests demonstrated the advantages of close coupling and were more responsible than anything else for the introduction of the M.C.B. coupler.

The significance of these events may not at first be so apparent to the younger railroad men of today, but it is well to stop a moment and think of the far-reaching effects which the battle of the brakes has had upon transportation development.

The vacuum brake made its appearance in this country almost as soon as the air brake. In its plain form it was used on all elevated cars in New York, controlled the cable cars on the Brooklyn Bridge for years and was more or less extensively used on many railroads. In its automatic form it was not as widely applied but the fight between the advocates of the compressed air and the vacuum brakes was a long and bitter one.

It was at once apparent that the two systems could not exist side by side. To equip freight cars with both types of brakes so that they could be interchanged and a road could use whichever one it deemed best was far too great an economic waste to be considered seriously. No one recognized these facts any better than did the brake manufacturers themselves. By 1890 the air brake had conquered and the vacuum brake manufacturers had turned their attention to the development of an air brake. Since that time there have been a number of changes in air brake devices, but with all the progress the new devices have been obliged to work in harmony with those already in service. This country was saved the confusion of an extensive application of two radically different brake systems. It thus seems strange to us to note the conditions which prevail in England and in some other countries today. Railroads are just beginning to equip freight train cars with power brakes and with two types of brakes in use on passenger trains the battle of the brakes which was fought to a finish in this country more than 30 years ago is now being waged again over there. The situation will seem stranger still after one reads the results of some recent vacuum brake tests described in an article in this week's issue and after one notes that the stops are considerably longer than we are accustomed to consider necessary for safe train operation.

New Books

Kidder's Architects' and Builders' Handbook. Thomas Nolan, editor-in-chief, professor of architectural construction, University of Pennsylvania, Philadelphia, Pa. Illustrated. 4½ in. by 7 in. 1,907 pages. Bound in flexible leather. Published by John Wiley & Sons, Inc., New York.

This is the seventeenth edition, revised and enlarged, of the handbook originally published by the late Frank E. Kidder in 1884. The general form of this book has not changed from the previous issues—a voluminous compilation of engineering data for the design and construction of all types of buildings. Thus, Part I deals with practical mathematics, Part II with strength of materials and structural design, and Part III with useful information for architects, builders and superintendents on supplementary matter relating to buildings. The revisions made in this edition are largely in the nature of alterations and additions required because of the advancement of the art. This is particularly the case with Part II in which two new chapters have been added on specifications for structural steel work and on domical and vaulted structures. The chapters on fireproofing of buildings and reinforced concrete have been re-written so as to cover new types of construction. In Section III the chapters on heating and ventilating have been re-written and a new section of chimneys and chimney design has been added. Additions have also been made in Part III under the head of registration of architects and standard documents of the American Institute of Architects. This edition is well up to the standard set and maintained for many years by the preceding editions.

Letters to the Editor

[*The* RAILWAY AGE *welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about* 250 *words—are particularly appreciated.*]

An Answer to Sir William Acworth

CHICAGO

TO THE EDITOR:

The answer to Sir William Acworth's citation of the New Haven as an example of a situation where the state (New England) might assume some portion of the railway's burden of providing transportation for the community is that the traffic of its territory was ample to furnish the necessary service at about half the cost 15 years ago, before union labor succeeded in imposing nationalization of wages and working conditions on a section of the country of limited earning capacity.

Let me specify. In 1907 the operating revenues of the New Haven were $55,601,000; in 1920, $123,512,000, an increase of 122 per cent, largely due to increased rates and fares now as high as the traffic will bear. In the meantime freight tonnage increased only 30 per cent and passengers carried only 57 per cent. Between 1907 and 1920 the average number of employees increased from 36,481 to 40,612, or a little over 11 per cent. Prior to the introduction of the eight-hour day there was an actual decrease in the number of days worked. But the real death's head at the New Haven board, banishing all prospects of dividends and surplus, and actually jacking operating expenses to over 100 per cent of operating revenues in 1920 (91 per cent in 1921) was the increase in the payroll from $24,052,644 in 1907 to $78,939,151 in 1920, or 228 per cent.

Let Sir William study these figures and ask himself if any system of railway operation on earth, private, national or hybrid, can survive such treatment. The pre-eminence of New England as an economical summer resort for the rest of the Union has been imperiled by its railway wage scale reacting on every other industry in the territory.

SLASON THOMPSON,
Director Bureau of Railway News and Statistics.

A Word for the Security Owners' Car Pooling Plan

HOUSTON, Texas

TO THE EDITOR:

I have been awaiting the comment of your journal on the proposal recently made by the National Association of Owners of Railroad Securities to the Interstate Commerce Commission with respect to reforms in car handling. Your editorial on page 508 of the March 4 issue is rather disappointing, at least to those of us who had looked upon the Association's suggestion as a possible realization of the long deferred hope of a freight car pool. As a matter of fact you have said very little about the pooling of cars, your remarks being confined to criticisms of the incidental features of the car pool, such as car construction, capitalization and repairs. (In considering these features as incidental I am guided less by the relative importance of the concrete monetary savings involved than by the fact that the primary object being sought is the maximum freight car utilization.)

A car pool has been advocated by progressive transportation men for a generation. The Association's plan, it is true, includes the car repair pool feature, but this is merely the logical complement of the distribution pool, the lack of which in previous pool proposals has been the main basis of attack by the opponents of pooling. The Association has, however, gone a step farther and undertakes to provide for an eventual standardization of equipment, thereby removing another of the arguments frequently urged against the freight car pool.

It is to be expected that any proposal of this kind will be general in its nature and that the various details will have to be worked out in "careful and detailed analysis by competent railroad officers," as suggested in the concluding paragraph of your editorial. Would it not have been better to leave all of these technical and detailed objections to those who are opposed to a pool per se?

The need for a car pool is self-evident. There is hardly a transportation man of any prominence in the country today who will not admit this. There is no doubt in my mind that when the principle of common control of freight cars is approved by railroad executives, the necessary machinery will be found to put the principle into effect. The experience of the railroads during federal control demonstrated conclusively that a transportation car pool cannot be successfully worked without a reform in the methods of handling car repairs. In my opinion the one big mistake of the Railroad Administration in its car handling policy was the virtual abandonment of the pool early in 1919 and the inauguration of a plan looking to the return of cars to the lines of their original owners. If the efforts of the Administration at that time had been directed toward a rational program of car repairs, an opportunity would have been afforded during the continuation of federal control to demonstrate or disprove the practicability of a general car repair pool. This experiment would have involved considerable expense but the expense would have followed the responsibility for the condition of the equipment at that time rather than being carried over and eventually saddled on the carriers.

In your criticism of the estimates made by the Association you entirely ignore the possible saving through reduction of empty car mileage as a result of adoption of a pooling plan. Possibly this is because that item forms but a small proportion of the $300,000,000 which the Association expects to save. As a matter of fact the Association's estimate of the possible saving in this particular field is entirely too low. Excess empty car mileage is a rather intangible item, but it is perfectly susceptible of demonstration that the excess empty hauls which result from an unnecessary home movement of cars place an enormous burden of expense on the carriers, generally at a time when they are least in position to stand it. The figures used in the Association's estimate cover a period of years and the natural tendency is to smooth out peaks during periods when such wasteful handling was most marked. Figures which were prepared by a number of transportation officers covering the latter part of 1920 and early part of 1921 indicated that the expense of relocating equipment at that time approximated $40 per car. In the month of December, 1920, alone there were over 200,000 cars relocated, the expense of this movement being about $8,000,000. The excess movement was not confined to December but continued in a greater or less degree for several months. It is, of course, true that this wild scramble to get cars home does not occur every year, but there are always periods of the year when cars are being moved unnecessarily in certain territories. These movements would be minimized under a general pooling plan.

While I share your apparent regret that this proposition has been brought into the limelight by an association outside the family of railroad operating officers, I do not agree with your apparent feeling that this should condemn the plan. It is a well known fact that transportation officers have for years endeavored to work out a practical pooling plan that would appeal to their superior officers. The Securities Own-

ers have been wise enough to adopt the best features of other plans which have been put forth in the past.

It is perfectly true, as you state, that the railroads cannot afford to let the proposal pass without subjecting it to critical analysis, but in my opinion the proposition should be approached from the standpoint of a desire to adopt the most progressive methods available, rather than with a view to finding technical defects which would condemn the plan.

O. C. CASTLE,
Superintendent, Transportation Southern Pacific Lines

"The Veterans of the Railroad Service"

WASHINGTON, D. C.

TO THE EDITOR:

At a recent memorial service it was said that "the boys in blue saved the country, but the railroad boys *made* the country." It was to perpetuate the memory of these "railroad boys" that the Veteran Associations were organized.

The movement originated about 20 years ago on the Pennsylvania. The initial branch was known as the Philadelphia Division, with headquarters in Philadelphia. Others soon spread over the four regions of that system. The original idea was purely social. It was quite patent to the laymen that the man who has spent half his life in the service of the railroads has acquired a spirit of railroad morale which means much to the public in the way of efficient service. To solidify and preserve the "family tie," these men came together voluntarily. By this close association they learned that it was not to their advantage to injure the business in which they were engaged and on whose prosperity and ability to function they, as a part of the public, were entirely dependent.

The railroad veteran movement spread slowly to other roads in the middle and western states. In 1912 the New England Association of Railroad Veterans was organized through the efforts of Earl H. Morton, then president of the Order of Railroad Station Agents. E. F. Brooks was elected president; F. H. Sidney, secretary, and E. H. Morton, chairman of the executive committee.

The main object of the New England Association was to build up a strong organization of all branches of the service, from track walker to president, so that a more complete understanding of each other's problems might be obtained with a view to their satisfactory solution. It sought to re-establish the old days when superintendents and even general officers could call their men by name, a custom which almost entirely disappeared with the expansion of the roads.

The movement in New England has prospered. From a nucleus of 77 charter members it extended rapidly over every railroad in that section, until today it has a total membership of about 7,500. It includes the presidents and general officers, men in all branches of train service, shopmen, maintenance of way employees, all classes of employees in station service and clerks in the general offices. Through its committees it handles all pension matters. All discussions on the subject of wages and working conditions are excluded. Careful watch is kept, however, on all legislative matters which affect the interests of the roads. Such legislation is endorsed or condemned, as the case may be, because these men realize that any bill that would adversely affect the employer could not fail to affect the employee vitally.

The New England Association recently endorsed the Winslow bill. What other body of railroad employees took similar action? Many railroad organizations not only passed resolutions condemning the bill but engaged in an active campaign to defeat it.

In 1914 resolutions were adopted by this association condemning the plan of dissolving the New England lines; favoring a full five per cent increase in rates and calling for a square deal for the railroads. As early as February, 1915, the veterans went on record as favoring "greater compensation to the railroads for the handling and storing of mail." It has been instrumental in bringing about the adoption of the second Sunday in May as an International Memorial Day for all railroad men.

The prime motive of a Veterans' Association is, of course, the establishment of a uniform system of pensions that are adequate but not burdensome. To this end it favors the adoption by the railroads of a uniform system of co-operative pensions for all railroad employees. Briefly outlined this system provides: that all men who are in the service at the time of its adoption be given the opportunity of entering into a general health, accident, retirement (pension) and life insurance plan to which they would contribute in monthly installments a small per cent of their monthly or weekly wage, the money to be deducted by the paymaster at each pay-period and turned over by him to the treasurer of the association, who would be properly bonded. The fund thus obtained would be known as the Annuity and Health Fund. From it would be paid sick benefits of not less than $5 per week, accident insurance of stated amounts according to extent of injury; monthly pensions (upon retirement) based upon a plan, i.e., one per cent of yearly wage to be multiplied by total number of years in service. To this amount the railroads would contribute a like amount, handled in similar manner either through one central organization or separately. This plan would necessarily be sanctioned by a proper law passed by Congress by which both parties would be obliged to carry out its letter and spirit.

This system provides further that all employees entering the service 30 days after such a law is passed must agree in writing to enter the insurance and pension plan. Those now in service shall be given the privilege of voting on the plan. After 90 days' consideration, their decision shall be final. Thus the constitutionality of any such law would be established. One important and incalculable effect of the adoption of the co-operative pension plan would be the impossibility of any general railroad strike. At a time when threats of strikes are two-edged swords held over the heads of the public, any preventative that is also a cure would be welcome to all the parties concerned. E. H. MORTON.

An Example of Reciprocity?

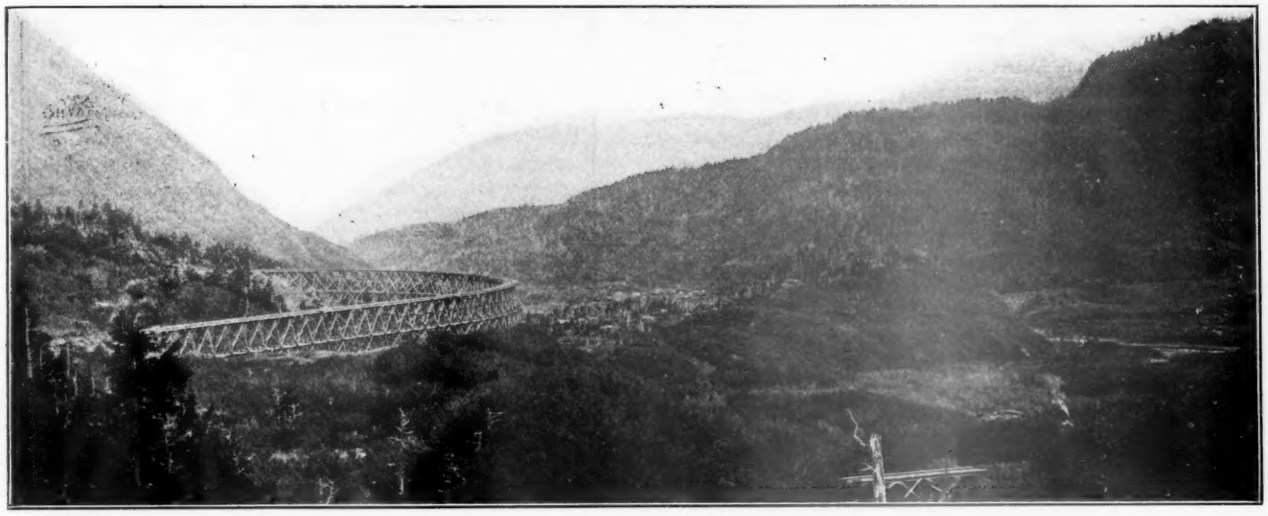
NORTH CAROLINA.

TO THE EDITOR:

In the *Railway Age* of February 25, page 459, you suggest reciprocity on the part of railroads in the maintenance of railroad crossings. This subject comes home to me in very painful form. Ours is a junior road crossing another at two points. We maintain the crossing and the towers and the approaches on both of the lines. As suggested in your editorial, we were compelled three years ago to install anti-creepers on the tracks of the other road in order to hold the crossing in place. But our principal grievance relates to the loading of our maintenance expenditures by alleged co-operation or supervision on the part of forces of the other railroad. When we have made repairs at these crossings, the other road has insisted on having its own section forces work with ours, the "co-operation" consisting mainly in seeing that our forces do most of the work. When possible they have had two gangs and two foremen in attendance.

Until recently the other road has had two signal supervisors, each of whom visited the plant at least twice a month. Usually they spent about 30 minutes at the crossing, but invariably we received a bill of about $15 for each visit. I submit this as the character of reciprocity received by the junior lines at railroad crossings, particularly where the junior line is a short line not able to retaliate at some other point.

GENERAL MANAGER.

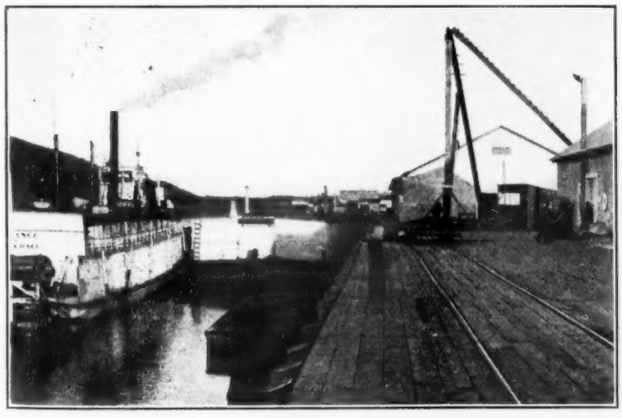


The Difficult Loop Section of the Alaska Railroad

Completing the Government Railroad in Alaska

Passengers and Freight Now Transported Between Seward and Fairbanks—A Distance of 467 Miles

As CONCERNS operation between the ends of its line, the Government Railroad in Alaska, now officially called the Alaska Railroad, is completed, the actual opening of the line between Seward on Resurrection Bay and Fairbanks in the interior, occurring on February 5, 1922. Previous to this time, trains had been operated over sections of the line as completed, and although transfer of passengers and freight is now effected through to Fairbanks, it is not carried out as yet by through rail connection except in the winter season. Actually Nenana on the Tanana river is the northern terminal of the road, passengers and freight being transferred at this point, ferried across the river and then carried to Fairbanks over a narrow-gage line. In the winter the narrow-gage tracks are laid on the ice in the river and the transfer from standard to narrow-gage made at Nenana. Bids now being received by the government call for the construction and completion of a 700-ft. span structure across the Tanana river on or before March 1, 1923.



The Docks at Nenana on the Tanana River

The completion of this structure with the necessary approaches, forms the main item in the budget for the fiscal year 1922–23. Other items of interest are a steel bridge at Spencer Glacier to replace a wooden structure now in use, the ballasting of about 50 miles of line in Broad Pass laid in the fall of 1921, and the widening to standard gage of about 56 miles of the narrow-gage Tanana Valley Railroad to Fairbanks. When this is carried out, the Alaska Railroad will have a through, 467-mile standard-gage line, with a total mileage, branches included, of about 539. Built through practically a wilderness, under trying conditions of weather and surroundings, aggravated numerous times by difficult physical obstacles, the railroad is an undertaking the completion of which is a credit to all concerned. Its construction recalls some of the more difficult of the pioneer railway building of the West with the addition further that it was carried on more than 2,000 miles from its base of sup-

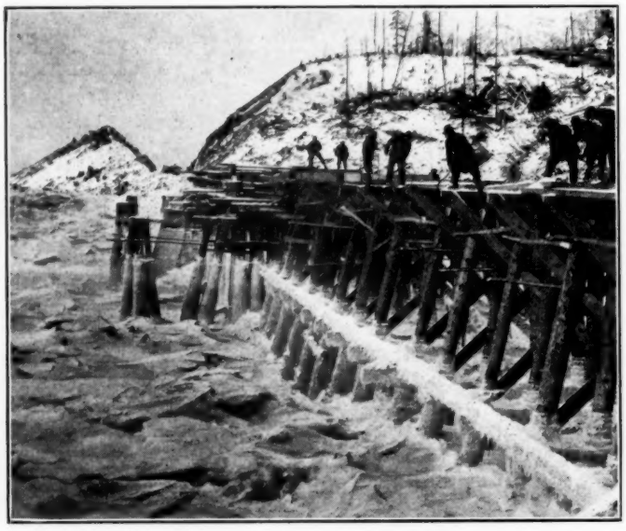
A Sight No Longer As Familiar As It Was Some Twenty Years Ago

plies and in a country where there were few trails and roads.

The authorization of the project was through an act of Congress passed on March 12, 1914, the cost being fixed at $35,000,000. Increasing prices for labor and materials during 1918 and 1919 soon developed the fact that the road could not be completed for that sum, and an additional authorization of $17,000,000 was made in 1919, making $52,000,000. This was still insufficient to complete the road and $4,000,000 more was requested. Based on a total expenditure of about $56,000,000, the Alaska Railroad will have cost, exclusive of equipment, etc., an average of about $78,000 per mile of line. With all facilities included, the cost is about $120,000 per mile of line. Articles descriptive of the progress of the railroad since its inception have appeared regularly in the *Railway Age* and are suggested as references in connection with this article.

Government Road Includes Two Existing Railroads

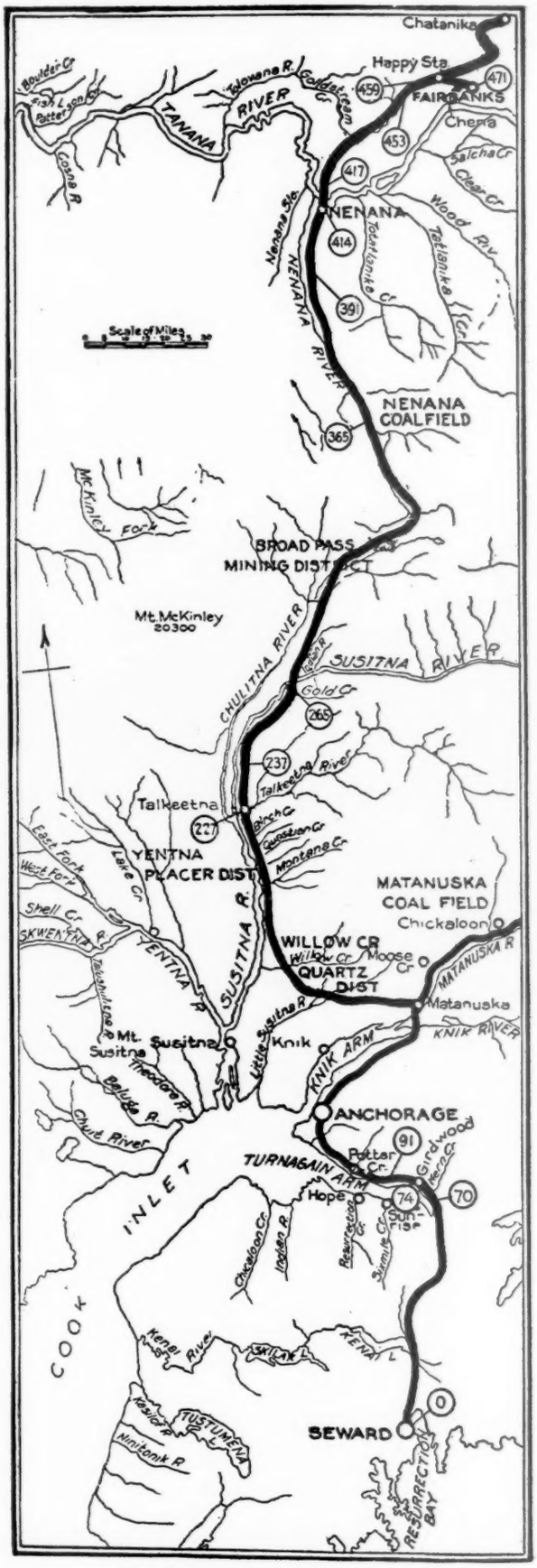
The line chosen for the government road includes two railroads initiated by private enterprise. It runs generally northward from Seward, a port open all the year, across the Kenai peninsula to Anchorage at the head of Cook Inlet,



Completing One of the Trestles Along Turnagain Arm

thence north along the general line of the Susitna river until reaching the main part of the Alaskan range. In this section Mt. McKinley is but a short distance to the west, the boundaries of the reservation extending to the line of the railroad. The railroad passes over the Alaskan range through a section known as Broad Pass and emerges on the north onto the cañon lands of the Nenana river, and the valley lands of the Tanana river into the town of Nenana, 411 miles from Seward. From the bank of the river opposite Nenana, the line swings to the east, reaching Fairbanks at mile post 467. This is considered the northern terminus although the old Tanana Valley Railroad, of which more mention will be made later, extends on to Chatanika, a distance of 39 miles.

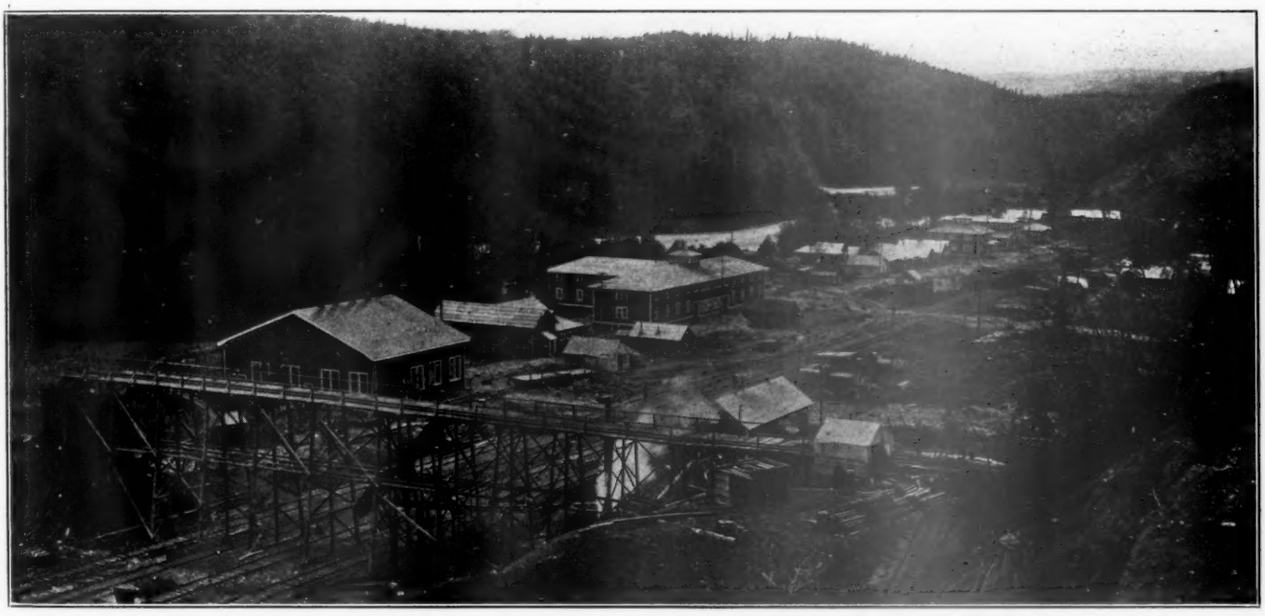
One of the several primary purposes of the government railroad was to tap and thus develop some of the great coal fields of Alaska as a source of fuel not only for the navy but for other shipping and mining facilities as well. It is interesting to know that Alaska contains practically the only satisfactory steaming coal on the Pacific coast as far south as Chile in South America. Another purpose was to transport inland the equipment and supplies needed to develop the mining and agricultural possibilities of the territory and to move out their raw and finished products. Coal, for instance, which formerly cost $18 a ton at Seward, was re-



The Line of the Alaska Railroad

duced to $9 to $10 a ton as soon as the line had reached the Matanuska coal fields, about 190 miles from Seward, and the first objective. The price of other products and supplies has been reduced since the completion of the line in a like or greater proportion with positive year-around deliveries in contrast to the old closed season of about four to six months when nothing could be moved in or out.

The backbone of the southern end of the line was furnished through the acquisition by the government of the Alaska Northern Railway, formerly the Alaska Central. The original intention behind this road had been to tap the Matanuska coal fields but because of financial difficulties the work had never been completed. Seward was its deep water terminus and the old wharves of that road were rehabilitated by the government for use with the federal line. These wharves form the only berthage for vessels coming into this port. Resurrection Bay, although indented 20 miles and an excellent harbor so far as navigation is concerned, has the drawback of having from 50 to 150 fathoms of water, making it practically impossible for ships to lie at anchor.



The Coal Town of Chickaloon in the Matanuska Fields

Rehabilitating the Old Alaska Northern

Leaving Seward, the Alaska Northern had completed about 71 miles, over which it operated intermittently. Owing to financial troubles, it later reduced the mileage in operation to 35, using a light gasoline car to which a trailer was sometimes attached. During this period the roadbed was allowed to deteriorate and one of the first things which was done when the government took hold was to rebuild this line. New trestles and bridges, ties and rails were installed, while curves were straightened or eliminated and grades reduced and standardized. Approximately four and one-half million dollars were expended in this work, which, up to Mile 71, formed the first undertaking of the Alaskan Engineering Commission. At about the same time a base was established on Ship Creek at the head of Cook Inlet. This was named Anchorage and became the headquarters from which all construction was controlled. All equipment, such as steam shovels, dredges, barges, locomotives, cars, etc., was landed at this base and much of it consisted of equipment brought up from Panama, where it was no longer needed. Work was started from this point toward the Matanuska coal fields and south toward Seward. About one year later a base was established at Nenana and construction started south from this point toward the lignite coal fields in that section of the country. The narrow-gage Tanana Valley Railroad was acquired at about the same time and its rehabilitation commenced.

Leaving Seward the road crosses two divides, reaching the summit of the first at Mile 12 with an elevation of 700 ft., after which the general grade descends, slightly rising again to the second summit at about Mile 45, elevation 1100 ft. The maximum grades in this section are 2.2 per cent compensated for curvature, with curves as sharp as 14 deg., of which, however, there are, in proportion, only a few. Descending from the summit the line follows the drainage of the Placer river and then enters the section where the heaviest construction of the line occurred. This is the loop section of the railroad. It contains numerous tunnels and a large amount of trestle work built of Douglas fir. Indicative of the class of work in this section is one trestle with a maximum height of 106 ft. on a 14 deg. curve. From Mile 49 on to about Mile 61 is the glacier section of the road, the line passing at varying distances from Bartlett Glacier, Spencer Glacier and Portage Glacier. It is also the section in which most of the trouble from snow slides has occurred, practically all of the snow sheds being located at points between roughly Mile 43 to 80, the latter point being 9 miles beyond the end of the old Alaska Northern.

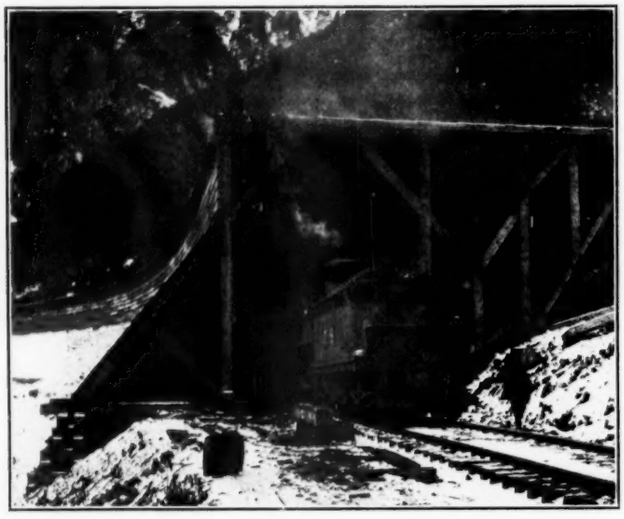
It was necessary to enlarge the tunnels of the old road and to rebuild practically all of the trestles. The grade reduction and other work also required some heavy construction in the form of cuts and fills most of which was carried out in hard rock that was difficult to handle. Being in the glacier section considerable trouble has been encountered in the tunnels through seepage of water under pressure, which, as soon as it strikes the air, freezes on the tunnel roof and rapidly forms large heavy icicles causing some danger to train operation. It is hoped to remedy this later by the installation of some kind of a heating system.

The Problem of Snow Slides At Turnagain Arm

The waters of Cook Inlet branch out at their head to the south and north forming two bodies known respectively as Turnagain Arm and Knik Arm. This forms a small point of land, upon about the western point of which is located

Anchorage at Mile 114. The head of Turnagain Arm strikes the railroad at about Mile 67, the line of the road following the shore line of Turnagain Arm into Anchorage, thence around the shore of Knik Arm on easy grades to about the head of the latter where it turns north a short distance reaching Matanuska on the river of the same name at Mile 152. In order to avoid several bad snow slides along Turnagain Arm, the railroad is carried out about ¼ mile from the side hills on a trestle about one mile in length. A series of spur dikes were installed partly as a protective measure against ice and partly with the idea that the tidal action might eventually make a fill at this point. The tide in Turnagain Arm averages about 38 ft. from high to low and one can walk nine miles across the arm at low tide as far as from 18 to 20 miles from its head.

The coal fields are located approximately 40 miles from the main line of the railroad and are reached by a branch following the Matanuska river. This river overflows in certain sections, often cutting new channels and causing considerable trouble. In addition much of it runs between shale bluffs from 150 ft. to 250 ft. high and from 1,000 to 6,000 ft. apart. These are, for the most part, a partially disintegrated shale with a nearly vertical dip and are badly shattered. Through these points the line has been diverted away from the bluffs, since it was found that if they were cut into, immense quantities of this shale would have to be moved and even then there would always be danger of slides. As a consequence, the line has been thrown out into the stream in various places and in order to protect it from the action of the ice and water, sheer dams about 60 ft. long and filled with rock were built at various points during construction to deflect the river away from the track but later hard rock



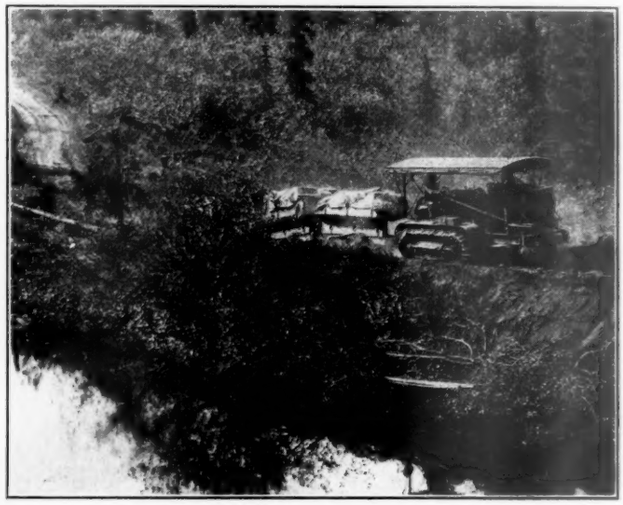
The Snow Sheds Are Built Primarily for Protection from Slides

rip-rap was found sufficient to protect the roadbed. The maximum grades used in the Matanuska coal field extension are 0.4 per cent against outbound loaded movement and 1.0 per cent against inbound empty movement. Thus for seven months of the year at least, it is possible to move out large quantities of coal in heavy tonnage trains to Anchorage for shipment out of Alaska.

Building North Along the Susitna River

Leaving Mile Post 152 where the Matanuska branch connects, the main line swings to the west and with a gradual curve to the north approaches the Susitna river and follows the river, more or less closely, for a distance of about 75 miles. The construction in places is heavy, the topography of the country requiring a large number of 100 and 120-ft. span bridges with approach trestles and considerable heavy cutting and filling. The construction of this section along the Susitna river was attacked at various points, the materials being moved in by water and by wagon road. From about Mile 233 the line leaves the flat lands adjacent to the river and follows the toe of the slope along the hills, holding very closely to the river edge. In one or two places the road passes over sections of the river bed. The grades are comparatively light with a maximum of one per cent in the heavy construction section.

At Mile 264 the river swings to the east, the railroad crossing it and continuing north into the Alaskan Range on a



Freighting in Supplies Over Trails Built by the Railroad Forces

1.75 per cent grade compensated for curves. The Susitna bridge was described in detail in the *Railway Age* of July 16, 1921, page 103. It consists of one main span of a 504-ft. steel truss, spanning the entire river from bank to bank to avoid the menace to channel piers from the rush of the ice in the spring break-up.

The Crossing at Hurricane Gulch

From Mile 264 the line ascends Indian river, a tributary of the Susitna, with increasingly heavy construction running into a section about 18 miles long, beginning at about Mile 284 and on which the cost of bridging was exceptionally heavy. The glacial streams in this section had eroded deep valleys which extend for many miles above the line crossing. The more spectacular of these crossings, known as Hurricane Gulch, is at Mile 284 where a deep gorge in the mountain side crosses the line, with a difference of elevation between the grade of the road and the bottom of the gorge of about 300 ft. The bridge used consists of a 384-ft. deck spandrel arch together with a number of steel girder approach spans giving a total length of about 920 ft. Construction was carried on entirely from the south end. A cable tramway of large capacity was first installed to serve the dual purpose of transporting bridge materials across to the bridge gangs and food and other supplies to a large grading camp on the north side. A large derrick was installed on the north side and as soon as construction had reached a point where it was practical, it was put into service. Materials including the steel bridge members were brought out upon the completed part of the structure where a locomotive crane picked them up and lowered them over the end of the cantilevered

end of the partly completed bridge. The derrick on the north side then made fast and working together, the two cranes swung the heavy material to the far side where the derrick was able to place it in position.

Ascending to Broad Pass the construction was much lighter. Broad Pass is an opening through the Alaskan Range of unusual topography. It is 6 to 8 miles wide and from 20 to 25 miles long and dotted with numerous lakes. From Broad Pass the road drops down to the line of the Nenana river which it follows generally. This river flows in more or less of a canyon and is very crooked with cut banks nearly the entire distance. Through this section the tracks were kept away, as far as possible, from the action of the river. It was necessary to make a high level crossing of Riley Creek at Mile 347 on a steel viaduct. The crossing of the Nenana river at Mile 373 was made at an elevation providing only for a normal clearance over high water. In addition there were numerous other bridges and trestle work. Grades averaged between one per cent and 1.5 per cent as a maximum through this section which ran until the flat valley lands of Tanana river were reached, the line being comparatively level into Nenana.

The Reconstruction of the Tanana Valley Railroad

The Tanana Valley Railroad which forms the northern section of the line is a narrow-gage road 39.2 miles in length with terminii at Chatanika and Fairbanks. A line 32 miles long extends to Chatanika in the mining district from a junction point 7 miles from Fairbanks. One of the first acts of the Commission was the reconstruction of the Tanana Valley and the construction of about 49 miles of new line to connect up Fairbanks with Nenana. This was done in conjunction with the work of building south from Nenana and was for the purpose of reaching the lignite coal fields as quickly as possible so that cheap fuel might be obtainable for the mining industries. A sidelight on the fuel question prior to the completion of this work is the fact that the timber in the vicinity of the mining district had been cut and burned as fuel for a distance of 16 miles back. The price had reached $15 to $20 a cord.

In constructing the line from Nenana to Fairbanks the new section was laid to narrow gage as a temporary expedient. Grading, ballasting, bridges, ties, etc., were carried out on the basis of standard-gage construction, the rail being laid to the gage required by the existing Tanana Valley equipment. The extension of the road running from the junction point to Chatanika was simply reconstructed as narrow gage and will be left and operated that way. With the closing up of the Government Railroad by the completion of the bridge across the Tanana river, the narrow gage to Fairbanks will be widened to standard although the section of line between that terminal and the junction point will be operated both as narrow and standard gage. The bridge across the river will be of the same general design as that across the Susitna river although naturally of a much longer span, 700 ft. in the clear as against 504 ft. at the Susitna crossing. The estimated cost of the structure including several miles of approach grades and trestles is given as $1,800,000 and one of the requirements of the construction is that it must be built between November 1, 1922, and March 1, 1923.

We are indebted to Col. Frederick Mears, chairman and chief engineer, and C. L. Mason, chief clerk, of the Alaskan Engineering Commission for the information contained in this article.

Freight Car Loading

WASHINGTON, D. C.

THE NUMBER of cars loaded with revenue freight during the week ended March 18 showed a decrease of about 5,000 as compared with the week before, according to the weekly report compiled by the Car Service Division of the American Railway Association. The reduction was due to decreases in grain and grain products and also in coal in spite of the threatened strike, but the figures for the week show an increase of 132,000 as compared with the corresponding week of last year. The total was 823,369 as against 691,396 in 1921 and 855,060 in 1920. In basing estimates of traffic on the carloading figures, however, it is well to take into consideration the fact that the average loading per car this year is less than it was last year. For January the average carload was 27.6 tons as compared with 30.1 in 1921.

As compared with last year increases in loading were shown as to all classes of commodities except ore, and increases were shown in all districts except the Southwestern. There was a gain as compared with last year of 65,000 cars in coal and of 30,000 in miscellaneous.

The summary for the week is given in the table at the bottom of this page.

The number of surplus freight cars showed another reduction during the week ended March 15 to 216,661, of which 79,803 were coal cars and 89,356 were box cars.

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED SATURDAY, MARCH 18, 1922

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L.C.L.	Miscellaneous	Total revenue freight loaded: This year, 1922	Corresponding year, 1921	Corresponding year, 1920
Eastern	1922	7,519	2,726	52,444	1,928	4,968	917	67,729	69,358	207,589	.....	.....
	1921	5,718	2,553	36,891	867	6,406	875	54,466	57,235	.....	165,011	207,831
Allegheny	1922	2,466	2,594	56,279	4,093	2,743	1,405	49,721	55,498	174,799	.....	.....
	1921	1,944	2,739	38,797	3,182	2,395	1,081	41,155	46,156	.....	137,449	183,137
Pocahontas	1922	237	72	23,167	230	1,189	20	5,916	3,613	34,444	.....	.....
	1921	157	62	13,347	144	1,404	8	5,156	3,291	.....	23,569	34,326
Southern	1922	3,618	2,087	23,976	546	17,283	653	33,615	44,629	131,409	.....	.....
	1921	3,052	1,682	16,043	545	13,317	716	35,730	40,939	.....	112,024	130,800
Northwestern	1922	10,795	7,589	7,285	1,273	16,290	785	27,705	30,497	102,669	.....	113,739
	1921	10,022	7,627	4,603	777	15,512	876	26,500	27,117	.....	93,034	.....
Central Western	1922	10,257	9,415	21,920	225	4,690	936	31,846	33,782	113,071	.....	.....
	1921	10,397	9,847	12,593	158	4,218	2,061	31,269	31,267	.....	101,810	119,750
Southwestern	1922	5,004	2,239	5,612	207	7,436	592	16,006	22,292	59,388	.....	.....
	1921	4,629	1,984	3,694	133	6,306	474	17,115	24,164	.....	58,499	65,477
Total all roads	1922	39,896	26,722	190,683	8,502	54,599	5,310	237,538	260,119	823,369	.....	.....
	1921	35,919	26,494	125,968	5,806	49,558	6,091	211,391	230,169	.....	691,396	.....
	1920	32,777	29,366	181,955	11,743	66,268	15,980	168,630	348,341	.....	.....	855,060
Increase compared	1921	3,977	228	64,715	2,696	5,041	.....	26,147	29,950	131,973	.....	.....
Decrease compared	1921	.....	.....	.....	.....	.....	781	.....	.....	.....	.....	.....
Increase compared	1920	7,119	.....	8,728	.....	.....	.....	68,908	.....	.....	.....	.....
Decrease compared	1920	.....	2,644	.....	3,241	11,669	10,670	.....	88,222	31,691	.....	.....
March 18	1922	39,896	26,722	190,683	8,502	54,599	5,310	237,538	260,119	823,369	691,396	855,060
March 11	1922	45,160	29,930	204,568	8,530	51,120	5,107	236,244	248,469	829,128	700,440	819,329
March 4	1922	49,520	28,329	196,639	8,257	47,664	4,651	231,433	236,762	803,255	711,367	811,106
February 25	1922	46,729	27,740	187,447	8,072	47,704	4,330	199,157	214,107	735,286	659,642	783,295
February 18	1922	54,209	30,327	190,700	7,666	50,796	4,034	219,050	224,142	780,924	692,007	772,102

Mileage Book Legislation Would Reduce Passenger Revenues

WASHINGTON, D. C.

TESTIMONY ON behalf of the railroads regarding bills to require the roads to issue interchangeable mileage books at a reduced rate was given at the hearing before the House committee on interstate and foreign commerce on March 28. Alfred P. Thom, general counsel of the Association of Railway Executives, said the carriers are opposed on principal to legislation of this nature and do not regard it as wise public policy but do not desire to be contentious. Therefore they would confine themselves to furnishing information as to the results of the study of men who have devoted their lives to the subject of passenger fares and submit it to the committee without argument. He read a letter from H. J. Hart, general counsel of the Bangor & Aroostook, who said that such legislation would be disastrous to his road, which operates its passenger service at a loss solely for the convenience of the public in its territory. Its fares are now on a basis of 4.5 cents a mile on main lines and 5.4 cents on branch lines, yet its operating ratio in passenger service runs from 108 to 110 and a reduced rate mileage book would still further reduce its revenues.

E. L. Bevington, chairman of the Transcontinental Passenger Association, gave estimates of the effect of a mileage book ticket on the passenger revenues of the roads, based on the experience of the past when mileage books have been used territorially or on single roads. He said the passenger revenues of the roads in 1920 were $1,288,808,159 and in 1921 $1,153,752,002, or an average of $1,221,280,085, from which he deducted $32,828,600 representing the Pullman surcharge, $56,750,000 representing commutation revenue and $131,701,485 representing revenue from special excursion traffic, leaving about $1,000,000,000 which might be affected by a reduced mileage book rate. He estimated that a 1,000 mile ticket would affect about 25 per cent of that and a 20 per cent reduction to a rate of 2.88 cents per mile would amount to $50,000,000, but if the rate were reduced from 3.6 to 2.5 cents per mile, or 30.5 per cent, a larger percentage would be affected and it would reduce the revenues by $137,000,000. A 3,000 mile book would cause a loss of $30,000,000 if sold at a reduction of 20 per cent or $76,000,000 if the reduction were 30.5 per cent, while a 5,000 mile book would cause a loss of $20,000,000 if sold at a 20 per cent reduction or of $38,000,000 if sold at a 30.5 per cent reduction. The higher the denomination, the less would be the effect because fewer people would buy books.

Mr. Bevington said it is impossible to estimate exactly the effect of a mileage book good on all roads but that a few years ago when mileage books were used about 20 per cent of the traffic in the territory involved moved on mileage books and in some districts as high as 60 per cent. In 1917 a 2-cent-a-mile book was used in the Southeast when the basic rate was 2½ cents and it was used by a major part of the traffic between the principal commercial centers. A generally interchangeable ticket with a greater reduction in rate would affect a larger proportion of the traffic. He illustrated how a 1,000 mile book could be used to defeat regular rates by showing that at 2½ cents a mile the one-way passenger fare from Chicago to New York would be reduced from $32.70 to $22.70. Members of the committee asked the usual questions as to why a lower rate would not stimulate traffic enough to make up for the reduction in rate. Mr. Bevington said that a temporary excursion rate will stimulate traffic but a reduction in the basic rate, available at any time, has very little effect. He recalled that when passenger fares were reduced from 3 to 2 cents a mile in many states there was a stimulation of travel for only about three months and pointed out that an interchangeable mileage book would practically affect the basic rate. A large reduction in rates would undoubtedly stimulate traffic somewhat, he said, but this would be largely offset by the reduction in the revenue from the ordinary traffic and the increased traffic would cause an increase in expense. In reply to Representative Cooper, he said that a 43 per cent increase in traffic between New York and Chicago would be necessary to make up in total revenue for the loss of $10 a ticket, to say nothing of the increased expense that would be caused.

Representative Johnson of Mississippi created a diversion by demanding that Mr. Bevington state the amount of his salary. This aroused a discussion among the members of the committee as to whether it was a proper question. Mr. Johnson insisted that "the railroads are guaranteed at the expense of the taxpayers and if they are paying fabulous salaries the public has a right to know it." Chairman Winslow finally ruled that a member of the committee had a right to ask such a question but that the witness might properly decline to answer it. Mr. Bevington then said he had no objection to stating that after 32 years of service he is receiving the munificent sum of $9,000 a year." Representative Johnson then asked that the entire colloquy except the question and the answer be stricken from the record.

Continuing his testimony on March 29, Mr. Bevington showed that the average cost of passenger service per car mile is above 40 cents, which would be about the revenue received at a rate of 2½ cents a mile on the average of 16.54 passengers per car. If a concession were granted to purchasers of mileage books, the railroads would not only lose the amount of revenue represented by the reduction to commercial travelers, but also more, because a large percentage of general passengers would avail themselves of the reduction. He also pointed out that even if the books were made non-transferable it would be impossible to prevent their manipulation by scalpers and others; also they would lead to the practice of checking baggage between points between which the holders of the tickets themselves did not travel. In reply to the claim that the railroads would make money by the interest on the advance payments for mileage books, Mr. Bevington said that the average life of a thousand-mile book is only about two months and the carriers would have the use of the money in advance on the average only for one-half of that time. For this period the interest figures out at 14.4 cents. On the other hand, the cost of a mileage book is about 15 cents and reducing this to 13 cents by crediting the passenger with the cost of 20 single tickets at a cost of 2 cents, this leaves a margin of only 1.4 cents for the railroad to cover the additional cost of accounting.

Mr. Bevington also said that the Interstate Commerce Commission has always opposed the idea of reducing rates on the wholesale principle, and that while a carload rate is usually less than the l. c. l. rate the shipper of one car pays the same rate as the shipper of 5,000 cars. He pointed out that the carload rate would not be extended to a shipper who would pay in advance for a number of carloads and then ship in small quantities and that commercial travel does not represent the wholesale principle, but a large number of small retail transactions. Purchasers of one-way long distance tickets between thousands of points in the United States pay for more transportation at one time than the commercial traveler would pay for a mileage book and thousands of round-trip tickets are sold that cost more than a 5,000 mile book.

When Mr. Bevington referred to reduced rate mileage book for commercial travelers as representing a discrimination, he was asked a number of questions as to why reduced fares for conventions, etc., are not discriminatory. He pointed out that such special fares are restricted to destinations and dates, that they stimulate traffic by inducing people to travel who otherwise would not, and that they fill the trains by concentrating the travel on given days, whereas the reduction in the basic rate or a reduced mileage book rate would

not be sufficient to fill the trains and would apply to a large portion of the ordinary travel for which trains are run on fixed schedules.

Representatives of a number of organizations of commercial travelers had previously testified before the committee urging legislation to require a reduced rate mileage book, saying that the "policy" of the railroads is driving traffic away because the high rates are leading traveling salesmen to use automobiles. One witness said there are 650,000 commercial travelers in the United States.

Carriers Denounce Delay in Wage Reduction Case

Railroad Representatives Attempt to End Further Quibbling Before Labor Board

"STRATEGY, COLDLY CALCULATED to interfere and delay" was the term given by J. W. Higgins, representing the western railroads before the Railroad Labor Board to the recent effort of the Railway Employees Department of the American Federation of Labor to obtain wage increases in the face of the railroads' requests for lower rates of pay. At the same time the charges of B. M. Jewell, president of the Railway Employees Department of the Federation, that the railroads are not legally before the board in the present wage reduction case were characterized by Mr. Higgins as "unfair and unsupported." These answers came on March 24 after a week of argument as to whether or not "proper conferences" as contemplated by the Transportation Act, had been held prior to the submission of the case to the board.

"As to Mr. Jewell's sweeping charge of bad faith and indifference in 'not even attempting to negotiate an agreement with the system organizations or employees'," Mr. Higgins said, "the Railway Employees Department sent out a circular letter signed by Mr. Jewell instructing each system federation to request conferences immediately with the railroads for the purpose of negotiating a wage increase of five cents per hour above the rates established by Decision 2. This action was taken in the face of the fact that the board had, in its decision 147, recognized a downward trend, and named rates which it considered just and reasonable under the provisions of the Transportation Act, and also in spite of the further fact that there had been a continued downward trend since the issuance of Decision 147.

"Keeping in mind these conditions, and also the ability of the gentlemen directing the movement on the other side, there is no escape from the conclusion that the inauguration of this program for a wage increase was to checkmate the proposed decreases by requesting such abnormal increases as to make any sort of an agreement impossible. As such an increase as they requested, or in fact, any increase, could not be in justice obtained under existing conditions, then the movement must have had another purpose. I hold that we have proved that their plan was coldly calculated to interfere with and delay the decision in this case. From their viewpoint, it was good strategy, because so far as I know, no wage decrease has as yet been made retroactive."

In support of this position, Mr. Higgins quoted portions of Mr. Jewell's letter of instructions to the representatives of the shop men on the various railroads, and asked if these instructions were not given to delay meeting the railroads on the merits of the proposed decreases, and to inject into the wage conferences demands for abnormal increases, and to insist upon these increases being discussed, thereby shoving the railroad proposition into the background, and forcing disagreements on the proposed increase only.

Referring to Mr. Jewell's allegation that railroad operating officers were without authority in the matter of wage rates because of an alleged arbitrary plan imposed upon them by higher authority, Mr. Higgins said: "No such plan ever existed, and is therefore wholly imaginary." He then outlined in detail the manner in which the western railroads arrived at the proposed new rates of pay, adding:

"There was nothing mysterious or nothing arbitrary about the source of the rates proposed in western territory. The rates came from the knowledge, experience and judgment of operating officers of the western railroads. There was no consultation or conference with either of the other sections of the country. The rates named (by the operating officers) were recommendatory, and it was well understood that each western railroad could exercise its individual judgment with respect to such rates in order to reach a settlement satisfactory to it."

The agreement recently reached between the Chicago, Burlington & Quincy and its clerical forces was cited by Mr. Higgins as an example of what could have been accomplished. He added:

"I believe the shop men on that railroad or any other railroad could have settled, had the representatives shown the spirit of compromise shown by the clerical men on the Burlington.

Shop Employees Seek Irrelevant Data In Wage Conferences

"One year ago," Mr. Higgins continued, "similar conferences were held in a general wage movement, which resulted in Decision 147. You may recall that in the hearing at that time protests were made by this organization against the early disposition of the question—they wanted it delayed, but not on account of the conferences. They claimed that until rules and working conditions then pending had been decided, the board was not in position to fix wage rates that could be considered just and reasonable. At the present time all rules have been decided by this board, and the means for gaining delay have been shifted to the attack upon the conferences held upon the individual railroads.

"Furthermore I ask you to note the character of the information each of the chairmen insisted upon having from managers, superintendents, mechanical superintendents, master mechanics or other local officers whose chief duty and concern is the safe movement of passenger and freight trains, or the safe maintenance of the equipment. They have, as a rule, no direct connection with, and are therefore unfamiliar with the larger financial, traffic and accounting features which the federated chairmen, for the first time, invariably wanted to talk about. These features included, for example, capital stock, bonded debt, gross and net earnings, traffic outlook, development and fluctuations, and ability to pay. These matters the federated chairmen insisted on knowing all about from the operating officers before they would discuss wages. Much of this information for which the chairmen seemed to hunger was seldom, if ever before, discussed even incidentally, much less used in local wage conferences, but this time the chairmen put questions on some or all of these subjects, but studiously avoided such things

as new facilities, new equipment and new wage rates.

"There was such a striking contrast in the uniformity of action on one side, and lack of it on the other in these conferences as to clearly point to the side that was thoroughly schooled, drilled and disciplined in the prearranged program. It did not matter whether the chairmen were nearby neighbors in the same city, or whether they were thousands of miles apart, they had an insatiable appetite for the same baffling information.

Charges of Bad Faith Unfair

"I submit it is most unfair to bring charges of bad faith against these men, alleging that they were unprepared in that they did not have or withheld proper information, and that they lacked authority merely because the federation chairmen called for a mass of irrelevant information. These conferences were held in good faith, they were of the same character as last year's conferences or any other conferences having to do with wage rates or working conditions. It does not follow that we held these conferences with less respect merely because federation chairmen, for some reason as yet unexplained, for the first time departed from long established custom and practice by calling for information of no practical use in solving the issue in the local conference—information of a character known only to men handling the financial, accounting or traffic work of these western roads.

Holds Conferences Proper

"We hold that proper conferences were held," Mr. Higgins said in closing. "We produced evidence from the individual railroads that established beyond a doubt that the railroads, in these conferences, were prepared to sustain, and did adequately sustain their proposed rates, with supporting data as to rates paid in outside industries, deflations in living costs, etc. We have shown that definite and distinct disputes resulted from these conferences. We have shown that the federation chairmen were not free agents. We showed that not one of them would even consider the rates established by Decision 147 as the basis for discussion or negotiation—that such freedom as they may have had was limited strictly to the range between 77 cents per hour (the present rate) and 90 cents per hour (the new rate proposed by Mr. Jewell) and we also showed that they would not join the railroad officers in a study of the rates in other industries.

"The railroad companies have, so far as the shop men are concerned, presented their argument for a decrease. We have not attempted to inject extraneous matter. It is our aim to be helpful in assisting the board to decide the question. It is not our desire to interfere in any manner with the presentation of evidence germane to these disputes, nor is it our wish to criticise the strategy or attack of the other side in any respect, but we have the right, and we do earnestly protest against the unfair and unsupported charges of bad faith made by Mr. Jewell and against his attempt at this late date to obstruct and further delay the hearings."

J. G. Walber Points Out Fallacy of Shop Crafts' Position

Mr. Jewell's efforts to have the wage reduction controversy remanded for further conferences are based wholly on a misinterpretation of the Transportation Act, according to J. G. Walber, representing the eastern carriers, who followed Mr. Higgins.

"It is obvious," Mr. Walber said, "that Mr. Jewell is laboring under a misconception as to the meaning of words. He seems to think that the work 'conference' is synonymous with 'compromise' and that because the managements on the several roads were unwilling to compromise, therefore, they were not conferring and, further, as the managements did not accept suggestions from the employees of splitting the difference between the increases they proposed and the decreases which the management proposed, which would have resulted in increases over the existing rates of pay, it was evidence to Mr. Jewell's mind that bona fide conferences did not take place.

"It is apparent that Mr. Jewell has confused the requirements of Section 301 of the Transportation Act with the obligations imposed upon the board by the provisions of Section 307. It is necessary under the requirements of Section 307 for the board in considering disputes which have been submitted to it, to give consideration among other relevant circumstances to the seven specific elements therein mentioned, while no such obligation is cast upon the parties to the conference by the requirements of Section 301, and if in the conference held under Section 301, by inadvertence or otherwise, some of the elements mentioned in Section 307 were not referred to and discussed, it does not in the slightest vitiate said conferences.

Joint Submissions

"Even aside from all that has thus far been said there is another reason which in and of itself should be accepted as sufficient cause for the dismissal of Mr. Jewell's contention that the conferences were not proper in the case of the eastern railroads. The submissions of disputes between carriers and the shop craft employees in a number of instances are joint: as a matter of fact on some 14 railroads in the eastern territory both parties have jointly certified to this board that they have conferred and having disagreed, invoke the jurisdiction of the board. This condition absolutely estops either party from now urging that the certificate which is signed in the joint submission was fictitious. On practically all of the other eastern roads Mr. Jewell himself has certified to this board ex-parte submissions of disputes in the matter of proposals for increases in pay. Having in mind that in practically every case joint conferences dealt both with the proposal for increases and the proposal for decreases, it is impossible to understand on what theory it can be contended that the conferences were proper as to the application for increases and improper as to the application for decreases.

"Considering all the phases of the situation, i.e., the conviction on the part of the managements that decreases were justified and the corresponding conviction on the part of the employees that increases were justified; the difference between the requirements of Sections 301 and 307; and the bona fide conferences held under the requirements of the act—we submit that these cases should not be remanded by the board for further conferences. To decide otherwise would open the way for either side to prevent local settlements of disputes and at the same time make it impossible to submit unsettled questions to the board."

New Rules for Stationary Engineers

A new code of rules to govern the working conditions of railway employees, members of the International Union of Steam and Operating Engineers, on the Baltimore & Ohio Chicago Terminal, the Chicago & Alton, the Kanawha & Michigan and the New York Central was announced by the Labor Board on March 27. The new rules, which are effective April 1, govern the hours of service and working conditions of stationary engineers on these roads, except those covered by the provisions of the Board's Decision No. 222, reported in the *Railway Age* of August 27, 1921, page 419. Included in the new code are provisions for the working of these employees on "split tricks," 8 hours within a spread of 12 hours, where service is intermittent and for the payment of time and one-half for overtime after the tenth hour of continuous service. The rules relative to payments for work not continuous with the regular work period and for Sunday and holiday work are similar to those announced by the Labor Board to apply to other groups of railway employees and described in previous issues of the *Railway Age*.

B. M. Jewell Attacks Nation's Industrial System

Justice of Rates of Pay of All Productive Labor Challenged — Asks "Living Wage" of $2,636

THE JUSTICE of the wage rates of all productive labor in this country and the principle upon which the railroads have proposed that rates of pay of railway employees be adjusted were attacked by B. M. Jewell, president of the Railway Employees Department of the American Federation of Labor, in taking up, on behalf of the Federated Shop Crafts, the defense of the present rates of pay of railway shop employees before the Railroad Labor Board on March 27.

"We propose to show how the entire purpose for which industry is operated can and must be changed. The so-called law of supply and demand will never afford a living wage in a system organized according to modern business principles," Mr. Jewell said. Declaring that the existing wage scales are insufficient to enable wage earners to maintain a "minimum of decent living" Mr. Jewell declared that an investigation conducted by economists in the employ of the Shop Crafts indicated that "low standards of living are due largely to an unfair division of the country's products."

"The railroads are saying to their employees, 'we cannot afford to pay a living wage,' while we say that the railroad industry must pay at least that," Mr. Jewell added. "This issue is not confined to railroad workers; the country must pay all productive workers a living wage."

After analyzing the necessity for the railroad industry paying its way, Mr. Jewell declared that this is an unwarranted distinction between the transportation system and the whole industry of the country. "Surely the whole industry of the country must pay its way if the country is not to go bankrupt," he said. "But to argue that each separate industry, run without co-ordination to the whole, must pay its way is as contrary to the facts as to argue that a given railroad siding or spur track must pay its way independently. If an industry can afford only a starvation wage it stands self-condemned. But our study has convinced us that taken as a whole industry can pay a living wage, and we are going to outline for the board the basis of this conclusion."

"We feel that mere adjustment of wage rates to minute variations in the cost of living would be a purely statistical problem for the board's force, requiring no hearing or elaborate preparation on either side. If the board should interpret its function to be merely to determine the level of wage rates established in the outside labor market, it would thereby become a mere gage and so defeat the purpose for which it was established."

The Shop Crafts' argument will take the following form, Mr. Jewell said: (1) an examination of the connection between wages being paid on the railroads and in industry as a whole and the cost of the necessities of healthy family life; (2) an exposition of the forces operating to determine wages in the labor market; (3) a study of the national income with a view to ascertaining whether industry can afford to pay a living wage; (4) a forecast of the effect upon the country's general prosperity which would result from the payment of a living wage.

Mr. Jewell Presents Detailed Food Budgets

In support of his charge that "the railroad industry is not today paying a living wage to the mechanics employed in its shops," Mr. Jewell presented a mass of cost of living data prepared by various members of the Federated Shop Crafts and including itemized monthly expense accounts, food budgets and other information of a similar character. These data disclosed, according to Mr. Jewell, that "the expenditures made by railroad employees' families for food falls far short of the minimum requirements for bare subsistence, below which it is dangerous to go, according to Professor M. E. Jaffa of the University of California, a specialist in food budgets and dietetics." Mr. Jewell's data indicated that mechanics in railroad shops were able to purchase about 64 per cent of the meat, fish, milk and eggs necessary to maintain their actual families at the lowest level of safety; 77 per cent of the necessary cereal foods, 91 per cent of the necessary vegetables and fruits, and 71 per cent of the necessary butter and oils.

"The deficit in railroad wages does not appear in dollars and cents," Mr. Jewell added, "it appears in a shortage of food. This is as truly a deficit to railroad industry as would be a failure to meet interest on bonded indebtedness. The result of such a deficit in terms of the general physique of the country and also in terms of the efficient operation of the railroads are sufficiently obvious. If an industry cannot meet its first fixed charge, the payment of a healthful livelihood to its employees, it is indeed bankrupt.

"It is argued that the railroads must meet their fixed charges. The general rule in business is that a concern which cannot meet its fixed charges is bankrupt. It seems to us that a healthful standard of living for his family represents a man's fixed charge. Failure to meet this means the realest kind of bankruptcy. It will mean eventual physical and moral bankruptcy to the nation."

Mr. Jewell's budget for railway shop employees requires annual earnings averaging for the entire country of $2,636.97 or $300 more than the budget prepared by the Department of Labor.

"Some people will undoubtedly want to interject some comment upon the absurdity of a mere workers' expecting an income of this size," Mr. Jewell said. "If they are honest they will recognize that they are remarking on the absurdity of the workers of the country receiving as much goods as are enumerated in the budget. The mere dollars and cents mean nothing; it is what they purchase that counts. If such people are really honest they will then proceed to enumerate the articles or quantities which it is absurd that a worker's family should have and will further state clearly what, in their opinion, a worker may expect as a minimum allowance of good things in return for his service to society."

To secure what this budget provides, railroad mechanics would have to earn 40 per cent more than they now earn, according to Mr. Jewell.

Wage Deflation Opposed on Grounds That Inflation Has Never Taken Place

Mr. Jewell's argument against the deflation of the wages of railway employees was based on the charge that the "rail and other workers of America never received 'inflated' wages." His economists disclosed, he said, that the only marked effect of inflation and deflation in wages is a weakening of the bargaining power of labor during the deflation period. Analysis of the financial history of the metal, chemical, cloth, clothing, food products, fuel, building material and house furnishing industries show, Mr. Jewell contended, that "throughcut prosperity and depression, wages are tied close to the subsistence level."

"Corner Storekeeper" Defended by Mr. Jewell

"Wage earners are not the only victims of deflation," Mr. Jewell added. "The storekeeper suffers equally, because as

wage rates do not increase with wholesale prices, the consumer cannot sustain retail prices which keep pace with wholesale prices. The corner storekeeper must stand the difference and hope to recuperate slightly as wages and retail prices lag behind descending prices."

"But here is the rub," continued Mr. Jewell, "the increase in prices is slow, extending over several years, but the men who profit largely in the ascent and stand to lose in the period of decline have control of the situation and plunge the country into deflation so suddenly that the possible gains of the corner storekeeper and the wage earner are entirely swallowed up because unemployment and part time reduce the purchasing power.

"It was not a buyers' strike but a buyers' lock-out which precipitated the depression with its unemployment. With a monopoly control of credit and prices and with a monopoly control of jobs, they precipitated a lock-out which by its suddenness and completeness forced the small business man, the farmer and the wage earner to carry the whole burden of deflation."

Mr. Jewell's study of the relation between prices and wages is based on the wholesale price index numbers of the United States Department of Labor and the figures gathered by the New York State Industrial Commission.

Mr. Jewell Asks for Immediate Ruling on Question of Jurisdiction

Prior to the presentation of his case as abstracted above, Mr. Jewell requested that the Board adjourn the hearings and immediately pass upon the request to remand the whole wage controversy to further conferences between the carriers and employees involved, in order that "railroad shop craft employees shall at this time be definitely assured that this Board will not sanction or approve non-compliance or perfunctory compliance with the law." At the same time he questioned the Board as to a press report stating that "the Board has decided to over-rule the union's request that the carriers requests be thrown out." The Board's answer to Mr. Jewell's demand for an immediate ruling and for information as to its attitude on the subject of conferences as indicated in this press statement was given in the form of a resolution of the Board read by Chairman Barton. This resolution said:

"It is the order of the Board that when both the representatives of the railroads and employees have completed their presentation on the issue as to whether proper conferences have been held, the hearing at once proceed on other phases of the case and the Board reserves the right to pass on the question as to conferences after the entire case has been heard. This order shall apply to the shop craft hearings and all the other classes before the Board on this hearing."

Mr. Jewell protested against this ruling as representing a departure from his "understanding of the procedure of any similar, or generally speaking, so-called judicial tribunal wherein the merits of the case are required to be discussed before that Board or that tribunal prior to the time that Board or tribunal determines whether or not it has jurisdiction."

"We stand here expounding the gospel of regular and orderly procedure," Mr. Jewell added. "This action on the part of the Board does not, in our opinion, make for the preservation of these things; it does not make for the encouragement of them. The success of the railroad industry must depend on the continuation of that procedure in our opinion."

This allegation was denied by G. W. W. Hangar, acting chairman in the temporary absence of Judge Barton, by stating that this action "is in accordance with the methods of the Board in previous cases where questions of jurisdiction have been raised."

Employees Again Ask for Investigation of Railroad Publicity

Mr. Jewell again asked the Board to investigate the publicity material put out in the name of the Association of Railway Executives and presented to the Board, as examples of this material, several bulletins issued under the authority of the Association and containing abstracts of the wage data recently submitted to the Board by Mr. Walber. The chairman of the Board stated that no action had been taken on the previous request of a similar nature but that the matter would be called to the attention of the Board in the near future.

St. Paul Clerks' Case Before Board

Clerical forces on the Chicago, Milwaukee & St. Paul could not agree with the management of the carrier regarding proposed wage decreases and the dispute has been submitted to the Labor Board. The carrier asked for a 10 per cent reduction and representatives of the clerks held out for a smaller reduction, citing the recent agreement on the Burlington as justification of their stand.

Albert Phillips, Labor Board Member, Resigns

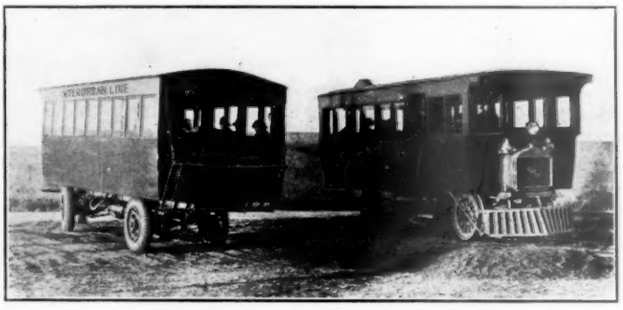
Albert Phillips, formerly vice-president of the Brotherhood of Locomotive Firemen and Enginemen, and for the past two years a member of the labor group on the Labor Board, has tendered his resignation from that body to President Harding to become effective April 15. Mr. Phillips has been ill for some time and has not appeared at any of the Board's public hearings since last December. No information has been received at the Board so far as to Mr. Phillips' future plans, but it is understood that as soon as his health permits, he will resume his duties with the Brotherhood of Locomotive Firemen and Enginemen.

Labor Board to Move

The Labor Board will, after April 24, be located on the twenty-second floor of the Transportation Building, Harrison and Dearborn streets, Chicago, instead of the Kesner Building, its present location. The new quarters will enable all the Board's offices to be consolidated on one floor instead of three as is the case at present.

Hearings on Enginemen's Working Rules

The Board on March 29 adopted a resolution ordering hearings on disputes between the carriers and their engineers and firemen as to rules and working conditions, to begin immediately after the present wage reduction hearings are closed. No mention is made in the resolution regarding similar disputes between the carriers and their conductors and trainmen.



The Same Design on Rail and Road

The Manhattan City & Interurban Railway of Manhattan, Kan., has changed from electric trolley cars to gasoline rail cars of the FWD type, the new cars being much lighter and cheaper to operate. At the end of the line the rail car connects with a motor bus of similar design which operates to outlying points.

Vacuum Brake Tests on English Freight Trains

Results of Great Northern Trials Reported Before Institution of Civil Engineers

THE USE OF VACUUM brakes both in England and in the United States is almost as old as that of air brakes. In this country the vacuum brake many years ago practically passed out of existence except for a few industrial locomotives. In England the vacuum brake has been continued in service and is even now extensively employed, and the same is also true to a large extent of some other European countries, as well as India, Australia, Africa and South America.

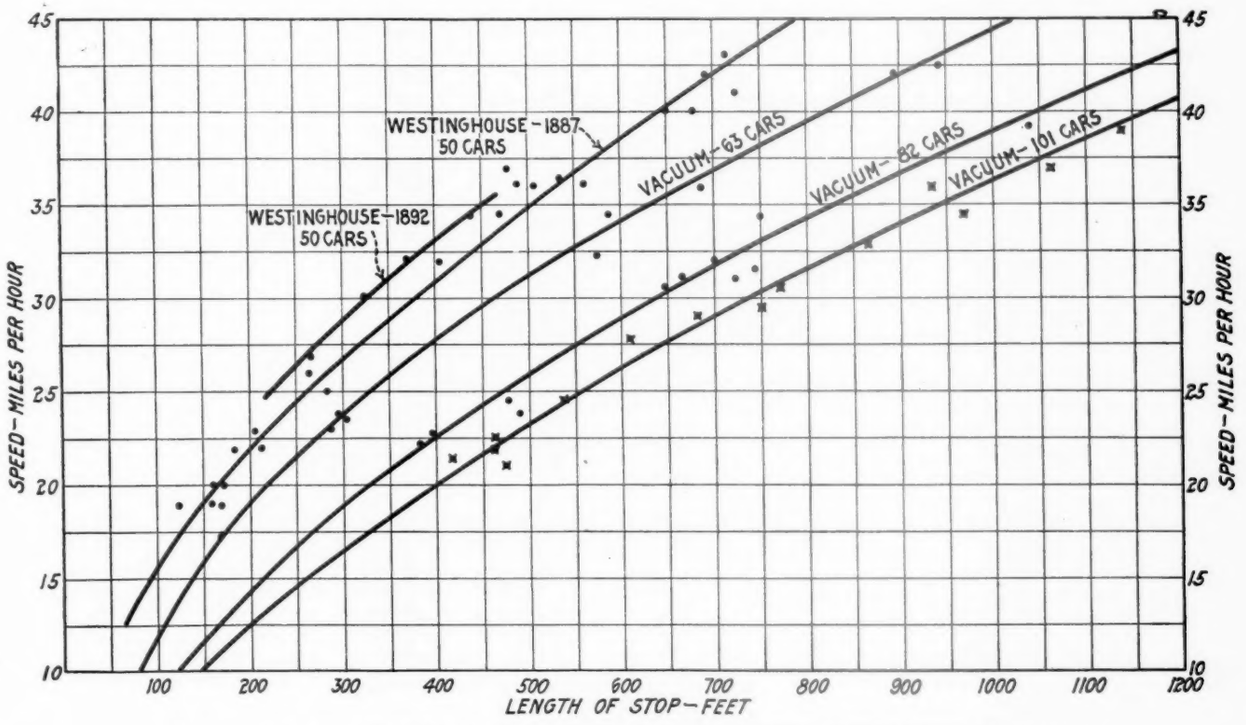
Evolution of the Vacuum Brake

In its evolution during the last 50 years the vacuum brake passed through changes paralleling those which took place in the air brake. At first, a plain vacuum brake met the requirements. The brake pipe was normally open to the atmosphere and an ejector was used to create a vacuum in the brake pipe and diaphragm or cylinder on the various cars when it was desired to apply the brakes, the vacuum being destroyed to release the brakes. This system was long ago superseded by the automatic vacuum brake in which a vacuum is constantly maintained in the brake pipe and in the enlarged chamber or attached reservoir above the brake piston, the vacuum being partially or fully destroyed to apply the brakes and again restored to release the brakes. A combined ejector and brake valve is commonly employed to create the vacuum and to control the admission of air to the brake pipe. This ejector has two nozzles, a large one for creating the initial vacuum and for releasing the brakes and a small nozzle for maintaining the vacuum after the brakes have been released.

Thus far the application of power brakes to freight equipment in England has been quite limited. The steadily increasing length and weight of passenger trains as well as a growing demand for power brakes on freight trains has, however, led to the development of accelerating or rapid action valves for the quicker application of the brakes on longer trains. These, however, have not yet been extensively applied.

Advantages and Disadvantages of the Vacuum Brake

To an American who has been accustomed to the air brake only, or who perhaps recalls the vacuum brake as largely an old experimental device, it is somewhat surprising to learn that the vacuum brake is even more common in England than the air brake. This raises the question as to why the vacuum brake has been able to retain its position and what advantages it possesses. The outstanding reasons appear to be: the simplicity of the mechanism and its low expense of maintenance; the perfect control of braking due to the fact that the braking pressure can be increased or decreased at will without releasing the brakes; and the smoothness of the stops, this last feature being due partly to the use of lower rates of retardation than are demanded by American railroads. There is a distinct disadvantage in the relatively large size of the brake cylinders which is a result of the low cylinder pressure of less than 10 lb. per sq. in. This is only one-sixth of the pressure used in air brake cylinders.



Comparative Stops with English Vacuum Brakes and American Westinghouse Air Brakes

Vacuum Brake Tests on the Great Northern

With a view to ascertaining the suitability of the vacuum brake for long freight trains, a series of trials was carried out during the summer of 1919 on the Great Northern Rail-

way. These tests were under the supervision of Sir Henry Fowler and H. N. Gresley who presented a paper before the Institution of Civil Engineers on January 10, 1922, giving the results of the runs. The facts given herewith are taken from this paper.

The main difference between braking freight trains and passenger trains are briefly as follows.—(*a*) The greater length of freight trains. (*b*) The necessity of running loaded and empty cars together in freight trains. (*c*) Even if screw couplings are used, the need of quickly coupling and uncoupling when switching will probably result in the couplings being screwed up less tightly than in passenger trains. This tendency to couple loosely enhances the need for a smooth and uniform action of the brake throughout the train.

For these tests the following conditions were laid down as a standard of satisfactory performances:

That trains of 100 cars, close coupled, must be stopped:

(1) By emergency applications without shock and without any risk of parting the train.

(2) By service applications without shock or risk of parting, and in such a manner that the train could be restarted immediately after coming to rest.

(3) That the speed of the train could be reduced as required.

The tests were carried out on the Great Northern railway between Petersborough and Firsby, this portion of the line being practically free from grades and curves.

Trains and Equipment

The locomotive was of 2-6-0 type. The weight of the locomotive in working order and the tender two thirds loaded with coal and water was 213,920 lb. All wheels were braked with the exception of those of the front truck. The ejector was a Gresham and Craven combined 20 mm. and a 25 mm. Dreadnaught.

The train consisted of Great Northern railway eight-ton covered vans or box cars, having an average light weight of 16,150 lb. and fitted with the G.N.R. standard vacuum brake, with the Westinghouse Brake Company's accelerators and reducing nipples. In addition to these the train included three Midland railway six-wheeled cars carrying the necessary recording instruments. One of these was placed at the front of the train, one in the middle, and one at the rear.

All the cars were unloaded and provided with screw couplings. The brakes were tested for leakage before the trials, and the travel of the brake pistons adjusted as required. The instruments comprised speed recorders and duplex vacuum recorders. The latter instruments (one of which was placed in the front, middle and rear vans) recorded the pressure in the train pipe and brake cylinder reservoir.

The average retarding force is the basis usually adopted for comparing brake stops. This force is convenient to express as a percentage of the weight of the train, and in the calculations, the weight of the train is taken as the gross weight of the train increased by the equivalent rotary inertia percentage, which was found from calculation to vary from 10.4 to 10.7 per cent of the weight of the train, being about 7.3 per cent for the locomotive and tender and 11.1 per cent for the cars. The forces concerned, inclusive of brake power, friction and gravity, are assumed to be acting uniformly throughout the stop.

The standard vacuum carried in the brake pipe was 20 in. and the average effective vacuum in the car brake cylinders with the brakes fully applied was 17 in. or 8.33 lb. per sq. in. The brake shoe pressure equalled 61 per cent of the weight of the locomotive and tender, 90 per cent for the cars and 86 per cent for the train complete with the locomotive.

Results on Trains of Various Lengths

The first tests were made with a 63-car train, each car being fitted with an accelerator and a standard reducing nipple between the brake pipe and the under side of the piston in the vacuum brake cylinder. The standard size of choke is 3/16 in. diameter for a 15-in. cylinder and 5/16 in. for an 18-in. cylinder. The weight of the 63 cars was 455.25 long tons or 1,019,760 lb. All emergency stops made under these conditions were satisfactory. It was found necessary, in making speed reductions or service stops, to apply the brake gradually, otherwise the accelerators operated, and unless the speed was high, say over 30 miles per hour, the train came to a stand before the brakes could be released.

The 80-car train was made up by attaching nine cars at the front of the previous 63-car train and eight cars at the rear; these cars had no accelerators or reducing nipples. Five emergency stops were made from speeds ranging between 22 and 42 miles per hour, but the shocks were so severe that in one case the train parted. The front nine cars were switched out and another emergency stop made, but the shock was so bad that the train again parted. The records of these stops were spoilt on account of the effect of the shocks on the instruments, and it was decided to abandon further trials with trains not completely fitted with accelerators.

The next tests were made with an 82-car train, fitted with accelerators and standard reducing nipples throughout. The total weight of the cars was 587.5 long tons or 1,316,000 lb. At speeds above 40 miles per hour the stops were fairly smooth, but between 30 and 40 miles per hour there was a rough jerk just before stopping, and for stops from 20 to 30 miles per hour the jerk was very severe just before coming to rest. The stopping distances of this train were almost identical with that of the 63-car train. Emergency stops were then tried with the working vacuum reduced to 16 in. These were fairly smooth except at the lower speeds, but the stopping distance was increased by about 20 per cent.

The next change was to reduce the size of the chokes in the nipples to 7/64 in. diameter for a 15-in. cylinder and to 1/8 in. for an 18-in. cylinder. The train consisted of the same 82 cars fitted with accelerators. The effect of the reduced nipples was to make the stops at all speeds quite satisfactory as regards being smooth, but increased the stopping distance by about 25 per cent.

Following these tests the length of the train was increased to 101 cars, the total weight of the cars being 719.5 long tons or 1,611,680 lb. All cars were fitted with accelerators as well as specially reduced nipples of the same size as those used on the preceding 82-car train. The emergency stops were quite satisfactory as regards being smooth, but compared with the standard of comparison—63-car train—the stopping distance was increased by about 35 per cent. Emergency stops were also made working with a 16-in. vacuum. In this case the stops were very smooth, but the stopping distance compared with the standard was increased approximately by 50 per cent.

General Conclusions

(1) The trials demonstrate that it is practicable with the vacuum brake to work long trains of up to 100 cars, provided that suitable accelerators and reducing nipples are used.

(2) Emergency stops can be made without shock with trains consisting of up to 100 cars.

(3) Service stops and speed reductions can be made and the train restarted promptly, provided that when running at speeds less than 30 miles per hour air is admitted slowly so as not to operate the accelerators. This necessitates the braking being spread over some distance, but allows time to have the brakes partly released when the desired reduced speed is reached, or just before stopping, and thereby en-

ables the train to get under way again almost immediately.

(4) It must be recognized that the provision of reducing nipples results in retarding the action of the brake and increasing the length of stops.

(5) In these trials the smoothest stops were obtained with the comparatively low working vacuum of 16 in. It is also easier to create and maintain this degree of vacuum than the usual 20 in., but the stopping distance in the case of emergency stops, is of course increased.

Comparison with American Air Brake Tests

In connection with the results in these English vacuum brake tests on the Great Northern as outlined in the above paper, it is of interest to compare the length of the stops with those obtained in American brake tests. Soon after the completion of the famous Burlington brake tests in 1887, the Westinghouse Air Brake Company perfected its quick-action triple valve. In order to demonstrate the operation of the device, a train of 50 Pennsylvania Railroad box cars was equipped and exhibition stops were made on a number of railroads in a dozen different cities. The cars were of 60,000 lb. capacity and 38 ft. 4 in. long. The light weight was 30,577 lb. each or a total of 1,528,850 lb. for the 50 cars, exclusive of the locomotive and tender. Including the locomotive and tender the weight was about 2,000,000 lb. The 50 American cars used at that time thus weighed about the same as ninety-five of the English eight-ton cars used in the vacuum brake tests described above.

As a convenient method of showing the results of these tests, the length of the stops has been plotted and a curve drawn for the general average.

In 1892 a series of brake tests was made on the New York Central at Karners in order to compare the Westinghouse and New York air brake systems. These tests were also made on 50-car trains of box cars of 60,000 lb. capacity. The average weight of the cars was 31,960 lb., making the total weight of the 50 cars 1,598,000 lb. The length of the train was 1,940 ft. The braking power on the cars was 70 per cent, calculated on 60 lb. brake cylinder pressure, the brake pipe pressure carried during the tests being 70 lb.

Stops were made at speeds ranging from 25 to 35 miles per hour. The average results have been plotted and are shown on the accompanying diagram.

On the same diagram curves have been drawn for the stops made with the English trains. One of the curves shows the stops for the 63-car train with accelerators and standard reducing nipples. Another curve shows the stops for the 82-car train equipped with accelerators and special reducing nipples while the remaining curve shows the results for the 101-car train with the same size special reducing nipples. On all the trains the standard working vacuum was 20 in. Stops have not been plotted for the runs made with a 16 in. working vacuum.

A striking feature brought out in these curves is the fact that air brake stops made in this country 30 to 35 years ago are noticeably shorter than those made in the recent English tests with trains equipped with the vacuum brake. For example, from speeds of 30 miles per hour, the stops for the Westinghouse train of 1892 was 325 ft.; for the Westinghouse train of 1887, 380 ft.; for the vacuum brake train of 63 cars, 465 ft.; for the vacuum train of 82 cars, 645 ft., and for the vacuum train of 101 cars, 745 ft.

In view of the results it would appear that the vacuum brake does not have the retarding effect of the air brake as used in America. It is unfortunate that conditions did not permit of equipping the test train with the type of accelerator valves made by the Vacuum Brake Company although it is probable that the results of the tests would not have been materially different. Had this been done and the tests continued the information obtained would have been even more valuable as an addition to the knowledge of braking.

Steam Railway Accidents in 1921

STATISTICS COMPILED by the Interstate Commerce Commission from monthly reports of railway accidents for the year 1921 reflect the falling off in traffic with a reduction of 14.0 per cent in the number of fatalities and 32.1 per cent in the number of persons injured in train and train service accidents as compared with the previous year. The reduction in the amount of industrial work performed by railroads is also reflected in a reduction of 11.7 per cent in fatalities and of 26.0 per cent in the number of persons injured as a result of non-train accidents compared with the year 1920. Eliminating trespassers the percentage of reduction in the number of persons killed and injured in train and train service accidents was even greater than the percentage of reduction in traffic.

SUMMARY OF ACCIDENTS FOR THE YEARS 1921 AND 1920

Kind of accident	Total trespassers and non-trespassers 1921		Total trespassers 1921		Total non-trespassers 1921		Non-trespassers: Employees on duty—Trainmen, 1921		Non-trespassers: Employees on duty—Others, 1921		Non-trespassers: Passengers, 1921		Non-trespassers: Other, 1921	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Train Accidents—														
Collisions	134	1,847	4	8	130	1,839	39	467	15	92	71	1,199	5	81
Derailments	177	1,982	45	128	132	1,854	100	530	1	76	22	1,138	9	110
Locomotive boiler accidents	26	53	...	...	26	53	25	52	1	1	....	....	....	....
Other locomotive accidents	3	20	...	...	3	20	3	16	....	3	....	....	....	1
Miscellaneous	18	163	...	5	18	158	3	41	8	18	7	90	....	9
Total	358	4,065	49	141	309	3,924	170	1,106	25	190	100	2,427	14	201
Train service accidents—														
Coupling or uncoupling cars	78	1,540	...	...	78	1,540	73	1,495	5	45	....	....	....	....
Coupling or uncoupling air hose	27	378	...	...	27	378	17	310	10	68	....	....	....	....
Operating locomotives	14	5,732	...	...	14	5,732	14	5,639	....	93	....	....	....	....
Operating hand brakes	22	1,623	...	...	22	1,623	21	1,610	1	13	....	....	....	....
Operating switches	2	847	...	...	2	847	2	764	....	83	....	....	....	....
Contact with fixed structures	86	888	32	79	54	809	41	736	4	39	4	27	5	7
Getting on or off cars	463	8,024	343	1,098	120	6,926	49	5,165	16	345	50	1,259	5	157
Highway grade crossings	1,702	4,818	106	166	1,596	4,652	1	43	12	21	....	1	1,583	4,587
Miscellaneous	2,835	15,409	1,951	1,587	884	13,822	270	9,100	365	1,659	51	1,870	198	1,193
Total	5,229	39,259	2,432	2,930	2,797	36,329	488	24,862	413	2,366	105	3,157	1,791	5,944
Grand total, 1921	5,587	43,324	2,481	3,071	3,106	40,253	658	25,968	438	2,556	205	5,584	1,805	6,145
Grand total, 1920	6,495	63,786	2,166	2,368	4,329	61,418	1,263	42,840	842	4,080	229	7,591	1,993	6,907
Increase or decrease (per cent)	—14.0	—32.1	+14.5	+29.7	—28.2	—34.5	—48.0	—39.4	—48.0	—37.4	—10.5	—26.4	—9.4	—11.0

		1921	1920	Decrease
Industrial and other non-train accidents.	Persons killed	409	463	11.7
Industrial and other non-train accidents.	Persons injured	77,361	104,523	26.0

The Theory and Practice of Store Door Delivery

Seven Speakers Discuss Possibilities and Problems of the Subject Before New York Railroad Club

AT THE MEETING of the New York Railroad Club on Friday, March 17, store door delivery was discussed as to its history, the practice in foreign countries, its advantages, the objections to it and actual experience with it in this country.

The speakers were Colonel Charles Hine, Robert E. Thayer, J. Shirley Eaton, W. J. L. Banham, T. C. Powell, W. C. Brinton and B. F. Fitch. Colonel Hine gave a brief sketch of the history of store door delivery in this country. Mr. Thayer, who is European editor of the *Railway Age* and but recently returned from England, told of the working of the plan in England, where it has been in operation since the early days of the railways. Mr. Eaton, who made an extensive study of the problem for the Federal Trade Commission, spoke upon the relation of store door delivery to markets. Mr. Banham, the general traffic manager of the Otis Elevator Company and who is one of the strongest advocates of the innovation, outlined its economic advantages to carrier and shipper alike. Mr. Brinton, consulting engineer and president of the Terminal Engineering Company, explained the operation of the system in Montreal and exhibited some lantern slides illustrating some practical suggestions for solving the problem. Mr. Fitch told of the advantages of the system and the methods of overcoming obstacles based upon his observations of the Cincinnati plan.

Address of T. C. Powell

T. C. Powell, vice-president of the Erie, described in detail that company's plan of store door delivery in New York. A brief description of this plan was published in the *Railway Age* of January 21, page 233. Mr. Powell's address was particularly informative and valuable in that it not only described a practical system of store door delivery which is in actual operation but because it touched upon the especially perplexing problem of distribution in New York, for which many and varied solutions have been proposed.

New York's problem arises from the fact that all but three of the important lines entering the metropolitan district terminate on the New Jersey or Staten Island side of the Hudson river. All these railroads maintain freight stations in piers on the New York side of the river and cars are floated to them from the Jersey side. The Erie plan is important, therefore, not only because it involves store door delivery, but because it contemplates the loading of motor trucks directly on the Jersey side and the movement of the trucks across the Hudson river to New York on ferries which radiate, fanlike, from the Jersey side to several points in New York. The New York pier freight stations can thus in large measure be abandoned and car floating reduced to a minimum.

Mr. Powell said in part:

The Erie Plan

"What the Erie has done in New York is the first move by a rail carrier of which I am advised, to deliver freight to an inland station and to make direct delivery to a consignee as the result of an investigation and of a decision that this was the thing to do, rather than as the result of competition of some other source of carriage or through a suggestion of a private individual who organizes a separate company.

"Before I describe in detail the Erie method I would like to revert a little bit to what has been growing in my mind for a number of years with respect to this kind of handling. I have only been with the Erie Railroad about two years. When I came I found that Mr. Underwood, the president, was very much interested in this question of making delivery by means of trucks, and had made considerable progress toward the plan finally adopted as I will describe later.

"During the Federal Administration, the Interstate Commerce Commission, at the request of the administration, investigated the possibility of some such plan as we have since put into effect. At that time they found a great deal of opposition from the numerous trucking concerns, and from some others, and that scheme fell to the ground. The term of office of the particular commissioner in charge afterwards expired, and there was no one else on the commission who had taken a special interest in it.

Private Company Contracts to Do Trucking

"The United States Trucking Corporation (New York) which is the largest trucking corporation of the city, has been found to be large enough to assume the responsibilities that must be connected with this class of service.

"Something over 20 years ago there was in the little town of Gainesville, Georgia, an enterprising truckman who undertook to do exactly what we are doing today, and he was very successful in doing it, so successful that he finally persuaded all the merchants in town to sell to him their trucks and teams and wagons, so that he performed not only the service to and from the freight stations, but also all the delivery service in the town. That was successful, and it was broken up only by reason of another railroad coming in and jealously trying to change the arrangement, and finally breaking up the contract.

"Years ago, also, I appreciated that the ultimate result of the extraordinary values of terminal property would be a financial problem quite as much as a physical problem. It was clear to me that in the congested areas (in which areas the less than carload freight is largest in volume) the price of land and the cost of maintenance would become so high that there would be no way of solving the problem except by extension of the facilities by means of a truck or dray, and that was before the automobile was in active service. I also observed at different places in the south, such, for instance, as Birmingham, that where the railroad was able to assign a definite space in the freight station to a transfer company under contract, not owned by the railroad, but under bond to the railroad, and under contract with the consignees whereby that transfer company could immediately collect the freight at the station and deliver it, that a space of 25 feet square under that arrangement, filled and emptied time and time again during the day by prompt service, accomplished just as much in the delivery of the freight as the space in the station the size of this hall under the ordinary 48 hours free time, and with shipments frequently remaining over because of delay of consignees. . . . .

"In St. Louis the condition was a little different from any of the cities that I have described. It is in geography the exact reverse of New York; in other words, you look from East St. Louis *west* across the Mississippi river to St. Louis, and here you look *east* from Jersey City across the Hudson river to New York.

"Now, originally the rates into St. Louis from all the eastern territory were made just as much higher than East St. Louis as the drayage charge; in other words, the drayage charge was commuted, and the rates were fixed on that basis, so that naturally a drayage service grew up from East St. Louis to the merchant warehouse without any regard to

whether the railroad running into East St. Louis wanted it or not. The shipper had the option of sending his team to East St. Louis and hauling his freight with his own team, or he had the option of making a contract with some transfer company, such as the St. Louis Transfer Company, and making the delivery in that way.

Advantages of the Ferry

"When I was living in St. Louis there was a great effort made by the real estate fraternity of St. Louis to force the railroads, such as the Southern, the Big Four, the Pennsylvania, the Alton, and the B. & O. principally, to purchase property in St. Louis, making out of course that that was for the benefit of St. Louis. It was the first time, and I trust the last, that I will ever be cartooned in a newspaper, because it so happened that I was very much in opposition to the plan of locating additional stations in St. Louis. I pointed out that the two cities were located in an ideal relation to each other to permit of what I called a fan-shaped distribution by railroad or by trucks from East St. Louis into St. Louis. At that time the Wiggins Ferry Company was operating its boats so that the teams could move to the ferry and be transported to a point opposite the center of the city, to a point opposite the lower part of the city, or to a point opposite the upper part of St. Louis, with a minimum of effort on the part of the horses and the quickest possible delivery without going through the congested streets of the city. In other words, where they did go through the thickly congested streets, they only teamed to the nearby points. Where they had to go to far points they went on the ferry to the nearest landing to those far points, so that always there was a minimum haul on land. . . . .

With all those thoughts in my mind, and that is my only reason for making that review, I said to Mr. Underwood when he broached the subject here to me, and showed me the difficulties that had been experienced in New York, that this to my mind was just as ideal a place for trucking service as St. Louis was, and as I pointed out, it is merely the reverse geographically. The problem, then, was to reach an understanding with a trucking corporation, the only one large enough being the United States Trucking Corporation. As you know, the freight coming across the river is unloaded in the piers. We use principally for the congested districts, piers 20 and 21, North river, but our problem was more than merely the congestion of the merchandise. That happens to be the location to which a large part of the fruit from the west comes into the city, amounting last year to something like 30,000 carloads. In 1900 it was less than 5,000, and in that period it has gone up to 30,000.

"There is not room on these piers for merchandise and the fruit. It is imperative to handle the fruit, and therefore we saw our merchandise gradually shifting to other points. Sometimes we had to borrow the premises of another railroad, so that we were forced to consider this question as a practical means of relieving our piers, 20 and 21.

The Problem of the Trucking Contract

"It was not so simple to put this arrangement into effect as one might at first think. It seemed to be an easy thing to say to the United States Trucking Corporation, or any large company (because you must have a large company), 'We would like to have you take our freight at Jersey City and deliver it in New York, and we will pay you for doing so.'

"Immediately the question came up as to the competing lines. They naturally said, 'What are you going to pay the trucking corporation for doing that work? Are you going to pay them so much, even though you might save money by doing so, that they can make an absurdly low rate to a consignee and thereby deliver direct to the store door at a lower cost than the consignee will have to pay in a combination of rail charge and private trucking charge via other railroads?'

"Again, there was the question of responsibility as between the carrier on the one hand, the trucking corporation on the other, and also the responsibility of the shipper. So that while we started this negotiation in the latter part of 1920 and carried it pretty well along in 1921, it was not until the very last part of 1921 that we were able to put the arrangement into effect.

"One of the things that we were insistent upon from the beginning was that whatever contract we made with the trucking corporation should be so open and aboveboard, and so fair to the trucking corporation and to the shipper and to the railroad as to be a document that we could hand to any one of the competing roads, such as the Lackawanna, the Lehigh, the West Shore, or the Central Railroad of New Jersey, and say, 'Here is our contract. If you duplicate that we have no objection.' A provision in the contract is that the trucking corporation shall not deal with any other railroad without our consent, but we have already given our consent to their dealing with several that they have asked permission to deal with.

"You all know that West street (New York) constitutes an eastern line for the piers and that there are no business houses on the west side of West street. In other words, at West street you are right at the edge of the water, practically. Therefore, we drew the line at the west curbline of West street. I might say that in St. Louis they drew the line in the center of the Eads Bridge, at the west end of the Eads Bridge. Up to that point the railroad assumes responsibility.

"The truck backs up to the car, or the platform in Jersey City, unloads the freight from the car, or takes it from the platform and puts it in the truck, brings it across the river on the ferry, for which we give free ferriage, and then through the ferry house, and at the moment the truck enters West street, if the consignment is going direct to the shipper's warehouse, the trucking company becomes the shipper's agent. Our responsibility to the consignee stops as soon as the truck crosses the west line of West street, if it is going to the shipper's warehouse, but the trucking corporation is responsible to the Erie Railroad as soon as the trucking corporation accepts the freight from the car.

New Freight Stations

"In all arrangements for so-called store deliveries, one of the great troubles has been the lack of option on the part of the consignee. We anticipated that, and we installed, or rather, we opened several inland stations. Of course we could not afford, nor could any railroad afford to purchase sufficient property in New York City to put up warehouses, unless they also went into the warehousing business as an adjunct to the particular warehouse. Therefore, through the trucking corporation we contracted for space. That space is on the ground floor. We have nothing to do with what is above the ground floor. Now, if a shipper says, 'I have purchased a carload of stuff, but I have room for only one truckload at my house, and I want the carload delivered at the inland freight station until I can get time in the next 48 hours to have it hauled to my place of business,' he gives that order to the trucking corporation. We permit no freight to be handled by the trucking corporation direct to a shipper's warehouse without the consent of the shipper. He must sign a memorandum or an order calling for that service. We do not force it upon a shipper. Therefore, if he does not give such an order, if he refuses to give an order, or for any lack of knowledge of the immediate transaction he does not know of the shipment coming in, it is delivered to one of our inland stations, because we are gradually closing our river stations, that is, the piers. We have closed Duane street to merchandise, as such, reserving it for the perishable goods. And we have given notice of closing pier 39, North river, excepting the space that is occupied by people who rent the pier, and we are proceeding along that line to close the piers

which we rent from the city, as we divert the business to the inland stations and to the direct service.

"An additional obligation in this contract is that the trucking corporation shall not make any extraordinary low rates from West street to the consignee's warehouse merely in consideration of our having already paid them for the service across the river. In other words, we have attempted to keep down the payment to the trucking corporation to what we believe is an amount that covers only their cost of service, and a reasonable return for the use of their equipment, including the risk on their equipment. . . .

Store Door Delivery an Ultimate Necessity

"In my opinion this kind of service is the ultimate necessity of this country, not because it has been practiced before, but simply because as an economic matter, as a matter of dollars and cents in the way of investing in terminal property it becomes a necessity. You can today, therefore, from St. Louis give your freight to the Columbia Transfer Company to be delivered in New York by the United States Trucking Corporation from door to door. You can in a sense do that same thing from Chicago because there are transfer companies there, but there is no local arrangement at Chicago such as there is at St. Louis, or as there is at New York. . . .

"My own conception of the thing is that ultimately all the stations in Jersey City, or on the west side of the Hudson river, whatever point is selected, it may be further back than Jersey City, will be combined into a large, comprehensive freight house into which all the freight trains will be discharged, and all the freight will be then brought over to New York. I do not mean by automatic tunnels necessarily, but through other tunnels or bridges and by ferry.

"There is one advantage that St. Louis has that we do not have here, and that is they have a bridge, and as yet there is no bridge here. The Jersey City-New York tunnel will be a great help in this arrangement. The tunnel will also be open to everybody else, just as it will be open to those who ship freight over the Erie.

Bills of Lading

"I should say something about the bills of lading. The United States Trucking Corporation handles all the documents at these terminal stations, and also where they handle the shipments direct to and from the shipper's warehouses.

"We use our Duane street station because that is known to everybody as our billing station, and the papers are delivered there to our agent as the truckman goes by, so that the billing is all in the hands of the railroad. The collection of money is made direct by the Erie from the trucking corporation; they collect it direct from the consignees.

"The trucking corporation is required by the contract (we have them under heavy bond) to observe every detail of the tariffs and of the Interstate Commerce Commission Law, and they are under just the same regulations as to extending credit as any one of our own agents is under, and they are supervised just as strictly."

THE DELAWARE, LACKAWANNA & WESTERN announces that its experiments in the use of telephones for communicating to and from moving trains, which were suspended at the beginning of the war, in 1914, are to be resumed; and on Wednesday, April 5, a radiophone test will be made on a special train, which is to be run for Cornell students on that day, from Ithaca, N. Y., to New York City. It is expected to give the passengers the privilege of listening to concerts and other matter broadcasted on that day and also to try transmission of messages from the moving train to stations along the line, within short distances. L. B. Foley, superintendent of telegraph, New York City, has charge of the radio experiments.

New Specification for Rails

THE RAIL COMMITTEE of the American Railway Engineering Association has given close attention to the manufacture of steel rails for more than 10 years. In this study it has had for its aim the improving of the quality of the steel entering into rails and the consequent reduction in the number of failures. The work of the committee has been directed largely towards the investigation of those influences which are detrimental to sound rail steel with the purpose of eliminating them in the specifications. This work led the committee to prepare specifications for rails which were adopted by the association in 1915 and revised in 1920. However, no rails have been rolled under these revised specifications because of the unwillingness of the manufacturers to accept them except with the payment of a premium so heavy as to be prohibitive.

During the past year the committee has been devoting considerable attention to the details of the rail manufacturing practices of the several rail mills of the country with reference particularly to the influence they have on the properties of the finished rail. Probably the most important item of manufacture that affects the quality of the finished rail is the condition of the steel as it is poured into the molds. A well-made steel thoroughly deoxidized with silicon or other deoxidizer sets quietly in the molds with a flat top on the ingot. A steel not fully deoxidized, however, effervesces in the mold and sets with a "horney" top on the ingot. The upper third of an ingot cast with effervescing steel is spongy inside with numerous small holes but with only a small central "pipe." Such steel also shows considerable interior segregation of carbon, phosphorus and sulphur, resulting in a brittleness in the interior of the head of the upper rail of the ingot. The quiet setting steel is free from interior sponginess, the segregation is much lower and the interior steel of the upper third of the ingot is denser and more ductile, but the ingot has a larger central pipe, which shows as a lamination in the web of the rail lower down from the top of the ingot than in rail made from effervescing steel.

As a result of this study a new specification has been prepared for dead-setting open-hearth carbon steel which has for its special purpose the elimination of segregation. While this specification was presented to the association at its recent annual meeting it was submitted as an experimental specification which had not, in fact, been passed on by the committee itself, but which the manufacturers have agreed to accept for rails rolled this year without additional charge.

The principal change in the specification as compared with the 1915 specification is in the raising of the silicon content from not less than 0.10 to a minimum of 0.20. Other chemical limits remain the same. The new specifications require that test specimens shall not fracture in the drop test, while tests for elongation and permanent set shall be conducted for information only. The height of drop is increased and option is afforded of two blows or of one blow with a higher drop. The specifications state that thoroughly deoxidized and quiet setting steel is desired, teemed into the molds at the lowest temperature consistent with the avoidance of stopper troubles and excessive ladle skull. Additions to the ladle shall be made in liquid form so far as practicable; if necessary to make cold additions, they shall be crushed to pass an inch and a half screen. The ladle should be held before teeming for the maximum time consistent with smooth operating conditions, so that the reactions may become complete, and their by-products properly vented. Ingots which have become cold shall be reheated in such a manner as to avoid injury. Sufficient discard shall be taken from the ingot to ensure freedom from injurious segregation and pipe. The supports for rails in the straightening presses shall have flat surfaces and be free from twists and shall be spaced not less than 60 in.

Wheeling & Lake Erie Watches Cost Factors Closely

Heavy Car and Train Loading—Prizes for Good Service and Checking of Details Promote Efficiency

By Charles W. Foss

PART II

THE NO. 8 coal field, as has been noted, is the most important of the four coal districts served by the Wheeling & Lake Erie. This field is served also by the Pennsylvania, the Baltimore & Ohio and the New York Central. The mines from which the W. & L. E. secures tonnage lie along its main line from about east of Jewett to the Ohio river at Warrenton. There are also various branches, of which that to Neffs—the Adena branch—is the most important. The latter branch reaches a rich coal area

Freight Station at Canton

which is, if anything, in process of development. It contributes in normal times over 200 cars daily.

The procedure followed in moving coal from the No. 8 field is about as follows: Operation centers on Pine Valley, which is at the eastern end of the line. Mallet locomotives are operated from Pine Valley to Brewster, the district being 63 miles long. They are loaded from Pine Valley to Jewett (20 miles) at about 2,680 tons and are filled out at Jewett to 5,360 tons. Formerly the method was to load the locomotives at Adena and then to use a helper or pusher, but this method was abandoned about two years ago because of congestion at Adena. Work is now in progress to put more of the work at Jewett, the scheme being to make the yards at Jewett a central assembly point, to weigh the coal there, etc. The coal is classified at Brewster for north, south or west. In winter, some 50 per cent of the tonnage goes west over the Toledo division; in summer, when the lakes are open, a much greater proportion. The Toledo division has no heavy grades; heavy Mikado or Consolidation locomotives of 60,000-lb. tractive effort are used, the locomotives being rated at 3,650 or 3,850 tons. From Brewster to Ironville, the terminal point just outside of Toledo is 136 miles; from Brewster to Huron, 82 miles. The eastbound rating on these same locomotives to Brewster is 3,360 tons. Helpers are used for tonnage trains out of Huron from Milan on the Huron branch to Hartland on the main line.

Brewster is a classification yard of about 1,650 cars capacity and is for both coal and ore traffic. There is a considerable movement of both classes of traffic north towards Cleveland. The scheme of operation is to use Mallet locomotives from Brewster to Gambrinus (Canton), 12½ miles. These Mallets make two round trips in eight hours. The reason for operating in this way is the necessity for taking proper care of the Canton district, notably with respect to the ore tonnage which is delivered to steel mills at that point. The Wheeling & Lake Erie serves about 100 industries at Canton. Gambrinus yard is a hump yard of about 1,000 cars capacity. Property has been secured and has now been held for some time sufficient to permit its enlargement to 5,000 cars capacity. From Gambrinus to Cleveland, 63 miles, is operated as a separate freight district. The so-called 60 per cent locomotives are used and are rated at 3,060 tons to Kent and from Kent to Cleveland at 3,650.

Spectacular Work in Heavy Car Loading

The Wheeling & Lake Erie in 1920 secured an average net tons per train of 1033. In other words, it was one of a few roads the average train load of which exceeded 1,000 tons. Its average net tons per car for the year were 42.9. This figure was exceeded by various roads handling coal to Lake Erie or ore away from it, but it is a fact, nevertheless, that the road has done some rather spectacular work in the matter of heavy car loading. Figures are available showing the

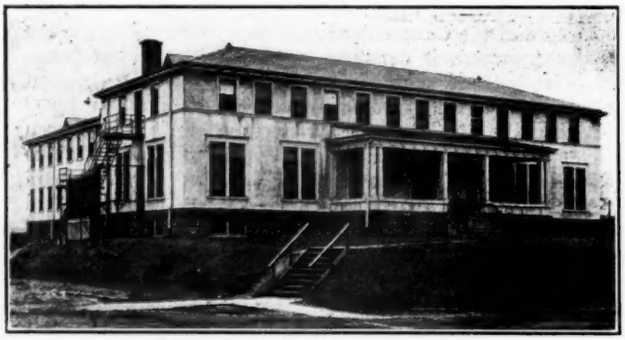
Station and Office Building at Brewster

number of tons, the number of cars and the average tons per car of coal dumped at the several Lake Erie piers during the 1921 season. The Wheeling & Lake Erie's average tons per car dumped at Huron was the highest figure for each of the several piers for every month but one from January to October. For the first four months of the year the W. & L. E. average at Huron was 63.02 tons; for May, it was 61.18; June, 61.54; July, 61.36; August, 57.77; September, 56.97 and for October, 59.12. The average for all the piers during these several months ranged between 52.31 and 53.89 tons.

The Wheeling & Lake Erie owns about 8,000 gondola and hopper cars of which about 2,600 are of 70-tons capacity and most of the remainder of 50-tons capacity. The heavy

loading is partly due, therefore, to the use of the large car. It is rather more due, however, to supervision of car loading at the tipples and to the co-operation of the coal shippers. The road had a rather enviable record in car loading during the period of federal control because of its efforts in these directions.

The road is unable to secure a high mileage per car per day and, therefore, net ton-miles per car per day. In 1921 its miles per car per day were but 13.2. This is due to the character of the business handled, notably the preponderance of slow freight. It is also due to the fact that the road originates and "terminates" the larger portion of its traffic. Cars must be held at the mines for coal and at Huron for



Railroad Y. M. C. A. at Brewster

ore, both factors combined having an appreciable result on the daily car mile average.

Because of the present decline in traffic it is hardly desirable to pay too much attention to the 1921 operating statistics. In 1921 the W. & L. E. had an average net tons per train of 918 as compared with 1033 in 1920. Its net tons per loaded car were 42.7 as compared with 42.9. The car miles per day were 13.2 as against 12.3. The figures show that the per cent of loaded to total car miles was 63.3 as compared with 72.0 in 1920 and that the net ton-miles per car per day, 357, compared with 379 in 1920. The W. & L. E. has a heavy train load. Its train speed (miles per train hour), however, is low. In 1921, it was 7.6 as against 7.0 last year. The net ton-miles per train hour were 6966 as against 7273 in 1920. The average for the Ohio-Indiana-Allegheny region in 1921, was 8435.

Prizes Offered for Efficiency

Another feature of Wheeling & Lake Erie operations is the manner in which the officers of the road keep after costs. For instance, prizes are offered to the yardmaster who secures the highest monthly average of cars handled per engine hour. Train crews are given prizes for handling the greatest number of ton-miles per hour of crew time. The prizes are awarded monthly. First prizes of $100 and second prizes of $50 are given to the engine and train crews making the best record. Similarly a first prize of $50 and a second of $25 are awarded to the man securing for the month the best average of pounds of coal per 1,000 ton-miles.

Daily Report of Loads and Empties Moved

In considering the manner in which the Wheeling & Lake Erie officers check the details of operation, attention should first be drawn to the "Report of Loads and Empties Moved in Transit and in Yards for 24 Hours Ended at 12.01 A. M." This report is a telegraphic report available the first thing on the morning following the period to which it applies. The form gives a clear and concise report of the entire railroad as to cars, their location, movement, etc. The report shows for each district by stations under the three heads: moved, in transit and in yards, separately for eastward and westward: trains, loads, all empties, and empties suitable for coal. Each district is totaled and the entire form is totaled and there is figured out and shown in a manner which will attract special attention the per cent of loads and the per cent of empties left over. In addition there are at the bottom of the form spaces for giving the details of coal and ore loading, of empties available for coal loading in the four coal districts and of the power situation. The form does not include the movement of expedite trains, as such movements are reported on a separate report. It will be seen that the report is a ready index of the preceding day's activities.

Daily Train Tonnage Report

The officers of the Wheeling & Lake Erie in checking details of operation seem to emphasize the factor of costs rather more than is the rule on most roads. This is indicated for one thing in the "Daily Train Tonnage Report." This report is not original to the Wheeling & Lake Erie but has been adapted from a form used by a few other roads. The report is a much more complicated form than that showing car movement. It is available about four days after the day to

Form 1901-L-A 3500] 6-21

THE WHEELING AND LAKE

THE LORAIN & WEST VIRGINIA

.....19

		GROSS TON MILES TO DATE		GROSS TON MILES THIS DATE		TOTAL COST TO DATE		COST THIS DATE		COST PER 1000 TON MILES TO DATE		COST PER 1000 TON MILES THIS DATE		NO. OF TRAIN MILES	
		THIS MONTH	LAST YEAR	THIS MONTH	LAST YEAR	THIS MONTH	LAST YEAR	THIS MONTH	LAST YEAR	THIS MONTH	LAST YEAR	THIS DATE	LAST YEAR	THIS DATE	LAST YEAR
Brewster to Ivorville including Huron Branch and L. & W. Va.	%														
Brewster to Jewett	%														
Jewett to Warrenton including River Division	%														
Brewster to Cleveland including Shreeveville Branch	%														
Brewster to Zanesville	%														
Lorain	%														
	%														
	%														
	%														
System	%														

Helper Eng. From To	TRAIN, ETC.					OUT OF TERMINAL					TON MILE DATA			No. TONS COAL CONSUMED	TOTAL COST OF FUEL	WAGES OF CREWS NO OVERTIME
	DIRECTION	CONDUCTOR	ENGINEER	TRAIN	ENGINE	LEAVING	CAPACITY IN TONS	TONS MOVED	% OF CAPACITY MOVED	NO. OF CARS	GROSS	NET	RATING			

Daily Train Tonnage Report—Left Hand Portion

which it refers. It shows the details for each train operated. The upper section of the form is devoted to unit values figured out for each district and totaled for the road. The unit values include gross ton-miles to date and this date; total cost to date and this date; cost per 1,000 ton-miles; number of train miles; engine miles; tons per train and engine mile; overtime, per cent of total wages; helper service and yard service; per cent of cost, etc.

On the lower part of the form there are given for the individual trains the names of the conductor and enginemen, engine, time, loads and empties handled, the engine rating, the tons and percentage of tons to rating, etc. Five columns are devoted to cost data, including the tons of coal consumed, the cost of fuel, wages (overtime wages being shown separately) and total cost of labor and fuel. The crew time is separated into initial delay, road time and final delay. Delays and their cause are explained in such detail as to require nine columns. The final result is the "Cost per 1,000 ton-miles." The form gives a wealth of details and the operating officer can readily get from it a real picture of what the road is doing. An illustration of the form is given at the bottom of this and the facing page.

FORM G. M. 1

THE WHEELING AND LAKE ERIE R'Y CO.—THE LORAIN & WEST VIRGINIA R'Y CO.

REPORT OF LOADS AND EMPTIES MOVED, IN TRANSIT AND IN YARDS FOR 24 HOURS ENDED AT 12:01 A. M. November 20th, 192 1.

Telegraphic Designation	EASTWARD: Moved — Trains	Loads	All Empties	Empties Suitable For Coal	In Transit — Trains	Engines In Thru Freight Service	Loads	All Empties	Empties Suitable For Coal	In Yards — Thru Frt. Engines	Loads	All Empties	Empties Suitable For Coal	STATIONS	Telegraphic Designation	WESTWARD: Moved — Trains	Loads	All Empties	Empties Suitable For Coal	In Transit — Trains	Engines In Thru Freight Service	Loads	All Empties	Empties Suitable For Coal	In Yards — Thru Frt. Engines	Loads	All Empties	Empties Suitable For Coal
	A	B	C	D	E	F	G	H	I	J	K	L	M			N	O	P	Q	R	S	T	U	V	W	X	Y	Z
AU	4	104	121	105	2	2	37	75	61	3	36	23	23	BREWSTER—PINE VALLEY	AU	6	68	2		3	3	32	2		1			
AV														SHERRODSVILLE	AV	1	6	4										
AW														JEWETT	AW		77	3				59				10		
AX														PITTSBURGH JCT.	AX	1	25	2								21		
AY	6	61	130	130										ADENA	AY	2	186	3								14		
AZ														ADENA BRANCH	AZ	4	83									62		
BA														A. C. & N. A. "	BA	2	24											
BC	1	23	12											PINE VALLEY—MINGO JCT.	BC	3	17	45	40	1	1	12	4					
BD		26	1								7	8		WARRENTON—TERMINAL JCT.	BD		16	5				2	5					
BE											8			OTHER POINTS	BE		108	15	15			8	2			60		
FK	11	154	264	236	2	2	37	75	61	3	50	31	23	TOTAL D.	FK	19	610	79	55	4	4	123	13		1	167		
FL													24	PERCENT OF LOADS LEFT OVER	FL	21												
FM													10	" " EMPTIES " "	FM	0												
FN	34	598	825	707	6	6	146	81	61	8	186	482	436	GRAND TOTAL THIS YEAR	FN	42	1395	271	111	11	11	350	65	25	9	367	78	5
FO													23	Percent of Loads left over this year	FO	20												
FP													36	" " Empties" " " "	FP	22												
FQ	34	658	758	555	5	5	103	57	20	10	218	452	429	GRAND TOTAL LAST YEAR	FQ	37	1485	253	105	8	8	316	42	25	6	784	90	33

Symbol	Loading past 24 hours	Cars
CA	Coal loaded in No. 8 District	267
CB	Coal loaded in Other Districts	13
CC	Total coal loaded	280
CD	Lake Coal Loaded	86
CE	Foreign R. R. fuel loaded	35
CF	Company fuel loaded	35
CG	Total fuel loaded	70
CH	Ore loaded at Huron	73
CI	Ore loaded at So. Lorain	0
CJ	Ore loaded other points	0
CK	Total Ore loaded	73

Symbol	Empties available for coal loading	Cars
GA	No. 8 District mines	370
GB	Massillon District mines	10
GC	Middle District mines	5
GD	Coshocton District mines	20
	Company material on hand	
GE	Slag	0
GF	Ashes	6
GG	Filling	7
GH	Fuel	788
GI	Other material	47
GJ	Total	848

Symbol	Power situation past 24 hours	
HA	Engines in through freight service	37
HB	Engines in local freight service	11
HC	Engines in work train service	2
HD	Engines in switching service	56
HE	Mallet engines in service	9
HF	Average miles per Mallet in service	81.3
HG	Engines out of service for shop work	72
HH	Engines for running repairs	22
HI	Engines laid up	5
HJ	Engines O. K. for service	0
HK	Engines in passenger service	19

LOCATION		WEATHER CONDITIONS: Temperature This Year	Temperature Last Year	Weather This Year	Weather Last Year	CREWS: Relieved Crews	Relieved Men	Recalled Crews	Recalled Men
		CG	CH	CI	CJ	CK	CL	CM	CN
TOLEDO	RA	37		Cloudy					
CLEVELAND	RB	38		"					
BREWSTER	RD	40		"					
PINE VALLEY	RE	40		"					
ZANESVILLE	RF	43		"					

Daily Report of Loads and Empties Moved

ERIE RAILWAY CO.

RAILWAY COMPANY

CAR SERVICE DEPARTMENT—DAILY TRAIN TONNAGE REPORT

UNIT VALUES

No. of Engine Miles		Cost per Train Mile		Av. No. Tons per Train Mile		Av. No. Tons per Engine Mile		Av. Miles per Hour		Av. Cars per Train		Overtime % of Total Wages		Helper Service % of Cost		Yard Service % of Cost		% of Crews on Local Rates		No. Trains Run		No. Cars Handled		Car Miles		Car Miles per Car Day	
This Date	Last Year	This Date	Last Year	This Date	Last Year	This Date	Last Year	This Date	Last Year	This Date	Last Year	This Date	Last Year	This Date	Last Year	This Date	Last Year	This Date	Last Year	This Date	Last Year	This Date	Last Year	This Date	Last Year	This Date	Last Year

Cost of Overtime	Total Cost Labor and Fuel	Miles Run	Crew Time: Initial Delay	Road Time	Final Delay	Total Hours	Av. Miles per Hour	Gross Ton Miles per Hour	Cars Handled: Loads	Empties	Delays and Cause: Orders and Trains	Accidents	Eng. Failures	Car Failures	Coal and Water	Waiting for Helper	Eta, Sw'g	Terminal Delay	Total	Cost of Helpers	Cost per 1000 T. M.	Remarks

Daily Train Tonnage Report—Right Hand Portion

Overtime Report

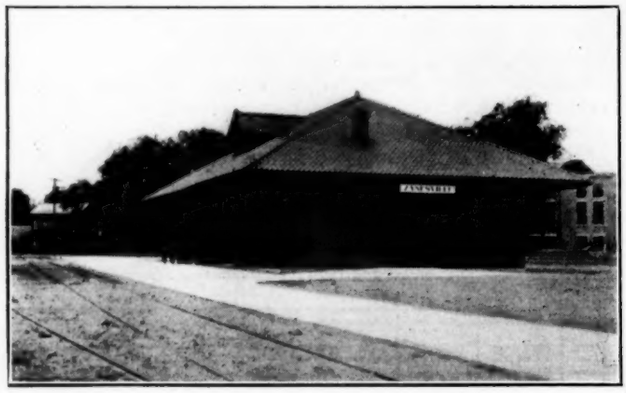
Another interesting form is the daily report of man hours or the report showing the amount of overtime. This report is compiled and placed on the desk of each operating officer within 48 hours after the occurrence. This enables the heads of the departments to be in absolute touch with the overtime made in their departments. They are held strictly accountable for such overtime and all overtime must be explained in detail. The information is of great value to the heads of such departments as it assists them in keeping overtime down to the minimum. Further than that, a detailed report relative to train service overtime is required from the chief dispatcher. The report shows the amount of overtime applying to different classes of service and in addition gives figures showing the number of orders issued by each dispatcher.

Report of Daily Expenses

Finally there is another form giving a report of daily expenses in the maintenance-of-way, bridge and building, transportation, and locomotive and car departments. This is prepared daily and telegraphed or telephoned to the heads of the various departments. The report shows wages only and is in the hands of the various departments within two days after the performance. With this information the heads of the different departments know just what amount of money is being expended for labor. It is of great assistance in the way of adding to or decreasing the forces so as to keep within the budget allowance for the various departments.

Use of the Several Reports

With reference to all these various forms, a Wheeling & Lake Erie officer said, "We have found that by supplying officers as well as subordinate officers with such information they will be continually on the alert and catch any increases that might develop. It also creates an incentive on the part of such officers or subordinates to feel that the money which is being expended should be just as judiciously expended as



Passenger Station at Zanesville on the W. & L. E.

if it was their own, all of which is, indeed, conducive to co-operation as well as economical operation."

This officer might also have drawn attention to the conferences which are held with the view of keeping the departments working together. There is another thing also that impresses one about the Wheeling & Lake Erie and that is the co-operation between the operating and traffic departments. This is secured on the one hand by the manner in which authority is given to such officers as terminal train masters who work closely with the shippers in their districts. This means that complaints are brought to the attention of the operating department before they become too serious for the best interests of the company and that accordingly they are promptly remedied.

Concentrating Pullman Reservations at San Francisco

THE SOUTHERN PACIFIC has recently installed a new telephone system for the handling of sleeping car ticket sales in its San Francisco offices which has greatly expedited the service. All train charts showing the Pullman space on every train are kept at one central office, reservations being made by telephone from the various ticket offices scattered about the city and surrounding territory. This system eliminates the possibility of duplicate sale of space while a close check can also be kept on the number of cars required on any train. This telephone exchange, built by the Western Electric Company, contains three 20-line switchboards and two cabinets for sleeping and

A Portion of the Pullman Checking Desk

parlor car reservations. Eight operators can use the board simultaneously, although during the absence of any of the operators, the remaining men can take care of incoming calls without changing their positions. When but one man is on duty, he can reach all the charts without leaving his seat.

The revolving cabinets above the desk, called "turrets," contain charts showing the reservations on each of the 22 trains running out of San Francisco daily. Each box in a turret contains charts for two trains, one face of the box having the charts for each day from the first to the fifteenth of the month and the next face having those for the sixteenth to the thirty-first. The two remaining faces of the box have similar charts for another train.

All of the city ticket offices have wires coming into this desk, as has each counter man in the consolidated ticket office. Ticket offices within a radius of 15 miles of San Francisco obtain their Pullman space in the same manner, and this has eliminated the necessity of assigning a certain amount of space to these outside offices. Trunk wires connect the checking desk with the main switchboard at the general offices of the road, through which communication may be established with any Southern Pacific station within a radius of 200 miles.

The central information desk is in the same room with the Pullman checking desk and telephone operators at the general office send here all telephone requests for information. Any of the clerks may answer the call.

Electrical Operation in Mountain Districts*

An Outline of What Is Being Done on the Chicago, Milwaukee & St. Paul

FOLLOWING is an abstract of a paper read by Frank Rusch, superintendent of motive power, C. M. & St. P., Tacoma, Wash., at a traveling engineers' staff meeting held at Milwaukee, Wis., November 28, 1921:

We are operating electrically on the main line over five mountain ranges, formerly the most difficult parts of the system, the Cascade and Saddle mountains in Washington, and the Bitter Root, Rocky and Belt ranges in Montana. On a total of about 660 route miles we have two maximum gradients of 2 per cent to 2.2 per cent for about 20 miles; two grades of 1.6 per cent to 1.7 per cent, and several of 1 per cent.

In freight service on grades of less than one-half per cent we can handle as much tonnage as the operating conditions will permit with one electric locomotive at speeds which may vary up to 30 miles an hour. On 1 per cent grade ascending one electric locomotive will handle 3,500 tons; on 2 per cent grade, 1,250 tons; on 2.2 per cent grade, 1,100 tons; all at a speed of about 15 miles an hour. We ordinarily use a helper locomotive in freight service on mountain grades so that our average freight trains will run about as follows:

1 per cent grade	3,500 tons
1.6 per cent grade	3,200 tons
1.7 per cent grade	2,800 tons
2.0 per cent grade	2,500 tons
2.2 per cent grade	2,200 tons

These ratings are based on the continuous capacity of the locomotives which occurs at 15 miles an hour at full trolley pressure of 3,000 volts.

In making comparison with the steam locomotives that were used prior to the electrification the tonnage rating and what was actually hauled over the Rocky mountains is as follows and applies to freight trains only:

2 Mallets, Butte Yard to Donald	2,500 tons
2 L2 Engines, Butte Yard to Donald	1,600 tons
2 Electric, Butte Yard to Donald	3,200 tons
2 Mallets, Piedmont to Donald	1,800 tons
2 L2 Engines, Piedmont to Donald	1,400 tons
2 Electric, Piedmont to Donald	2,500 tons

The tonnage hauled over this mountain is greatly in favor of the electric motors. The mountain grade from Butte Yard to Donald is 1.6 per cent and from Piedmont to Donald on the east slope is 2 per cent.

On the 2 per cent grade over the Saddle mountains in Washington two electric motors haul 2,200 tons at a speed of 15 miles an hour, whereas two Mallet engines haul 1,600 tons at a speed of about eight or ten miles an hour.

In passenger service we are not using any helper power. These locomotives are built strong enough to handle 960 tons of passenger equipment over any portion of our track. They make good speed in ascending grades and their speed on level track is only limited by operating conditions.

In switching service we have electric locomotives at Butte, Deer Lodge and Othello. In special service we have used electric locomotives to push snow plows, on work trains and for wrecking outfits, and obtained efficient results.

Fuel and Water Stations Eliminated

One thing which seems of considerable importance to the steam man in first operating an electric locomotive and which is soon likely to be forgotten with other commonplace things, is that no stops are necessary for fuel or water. When you consider the delays, train troubles and extra work of watering engines, encountered in mountain traffic, you can see that the complete elimination of such is no small item in bettering train operation. When you consider that a large part of our mountain district is through comparatively dry territory the elimination of pumping plants to supply this water represents economy.

Another feature which applies to all kinds of service and of which we have good report is that although the electric locomotives weigh more on drivers than any steam power, they are easier on curved track, at least, than the steam engines. On tangent track the difference is not so apparent, but it may be stated that there have been no radical changes made in track construction since we electrified, nor has there been any apparent reason for making changes. Considering that mountain trackage has a high percentage of curvature, this advantage of electrical operation is appreciable.

But in order to deal specifically in bringing out advantages of electric motive power in the mountains, it will be better to go more into detail. I can perhaps do this best by considering different kinds of service separately and by giving examples of actual operation.

First in importance is the freight service in which we have reduced the number of engines required and the work of keeping them in service. We have practically reduced our running time between points by 40 per cent and have increased our tonnage in the worst districts by about the same amount. In spite of increased tonnage the drawbar reports show a decreased number of accidents of this nature after the men have become accustomed to electric operation. The fuel consumption or kilowatt hours at the locomotive shows marked economy and there is no doubt but that with a sufficient number of trains operating, marked economy for the whole system is possible over steam operation.

Regenerative Braking Does More Than Return Power to Trolley

Freight trains can be handled over mountain grades without stopping and due to the regenerative feature may be handled without applying an air brake on the whole train, unless for some reason it is necessary to come to a dead stop. The regenerative braking not only saves the brake rigging but also returns energy to the trolley which may be utilized in helping move other trains. Whatever may be the return on this regenerated energy the saving made in ease of train handling with less number of break-in-twos with consequent damage and delays, is an important advantage.

The various tests on brake shoes in making a run from Avery to Harlowton show that about one-fourth of the brake shoe was worn away in controlling the speed of the trains on mountain grade, while in the westward movement between these two points it showed approximately one-fifth of the brake shoe worn away. A conservative figure on the value of the metal dissipated through brake shoe wear during a thirty-day month period would be $6,000; this is not including the saving in the way of cracked wheels through overheating. Both of these items of expense have been practically eliminated through electric operation.

We expect at some future date to combine regenerative braking which sends the current back into the wire and which we have at present, with rheostatic braking which consumes the braking energy in the starting resistors, so that we can use electric braking at speeds down to prac-

*Milwaukee Employees' Magazine, March, 1922.

tically a standstill. This will be a matter for experimentation.

Starting freight trains on ascending mountain grades is comparatively easy and not at all likely to result in drawbar damage. The helpers are placed in the middle of the train and the head locomotive can when starting let the slack back as far as the helper. The helper man then can advance his controller to give maximum tractive effort and is ready to follow with the slack when the head locomotive starts. With electric operation we have quit breaking drawbars almost entirely in the mountains.

We do not need engine watchmen with electric motive power and at any point where one of these machines is tied up it is only necessary for the enginemen to drop the pantographs and shut the doors and windows. This is particularly advantageous at helper tie-up points. At Butte and Piedmont when we first electrified we had as high as six to ten steam engines, mainly required for helper service. These were replaced with two electric locomotives, which have successfully done the freight helper work since. The passenger trains not requiring helpers have to some extent made this possible of course, but this itself is also another advantage of electrical operation.

Regenerative braking makes it a decided advantage to use a helper descending a grade as well as in going up on the other side. We have only one heavy grade on the Cascade mountains where this is not applicable. Otherwise our helpers ordinarily go clear over the summits. It is common for a helper to go in a train upgrade to Boylston and down to Beverly then back to Kittitas light with zero net consumption of kilowatt hours, or regeneration in this case, making it possible to operate helpers in eastward traffic from this point at no fuel expense whatever.

The increased safety in having two locomotives in trains of this sort on heavy grades can be appreciated.

In passenger service the delays and rough handling necessary to the operation with helpers is entirely eliminated. The same locomotive which may haul the train at 50 miles per hour can also handle it with ease and certainty on a 2.2 grade.

Here again the regenerative braking feature is important. One who has tried to sleep in a passenger train through mountain districts and has been kept awake by application of brakes at frequent intervals can readily appreciate the comfort of an electrically operated mountain trip in which it is impossible to tell from the way the train is handled as to whether a grade is being ascended or descended.

The smooth handling of passenger trains is a point of merit and occasions many favorable comments from passengers about our service.

The entire absence of cinders and a certain amount of grime from coal burning locomotives is appreciated by the passengers. Complaints of delays caused by poor fuel, engine not steaming and sundry things have become things of the past. We do have our troubles with electrical failures, it is true, but these are nearly all in a class not to be called serious and fortunately are of uncommon occurrence.

Electric Switching

In electric switching service we find that the energy or fuel expense at the locomotive has been more than cut in two over steam operation. The locomotives are quick in acceleration, easy to handle and because the engineer has little to look out for other than the operation of starting and stopping, he can lend his whole attention to the business at hand and thus gets as much work done as the yardman can attend to.

The maintenance of these machines is slight and because of taking but little energy the extra demand for power that they require is not very noticeable at the substations which furnish it.

Wherever the trolley wire goes the electric locomotive has given particularly good results. In rerailing cars or engines or pushing snow plows the uniform rate of speed for a given load and the ease with which the locomotives can be controlled make their use decidedly advantageous.

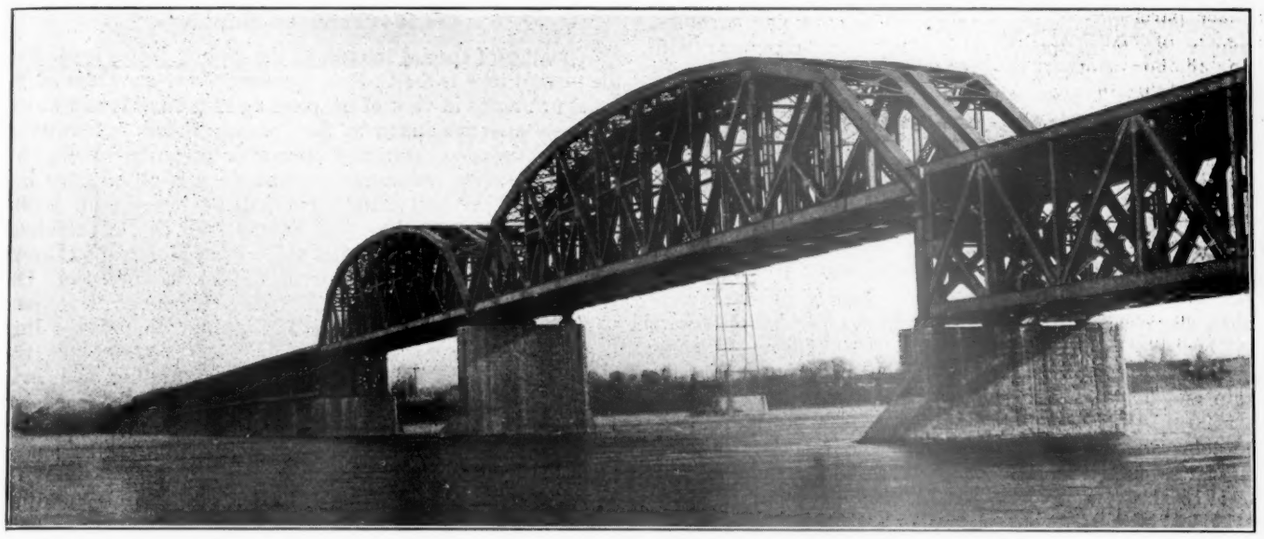
The rated tractive effort of an electric locomotive is usually given as that within the continuous or 24-hour capacity of the traction motors. This is 72,000 lb. for our freight locomotives, but does not mean very much as compared to the maximum tractive effort which the locomotive can exert. This is only limited on these machines by the slipping point of the wheels. With sand used on the rail they have been known to exert a tractive force of 160,000 lb., and this could be maintained for a period of time until the tractive motors are in danger of overheating due to the large flow of current through them. Such tractive effort makes these machines efficient in handling certain work under adverse conditions as mentioned above.

Each Locomotive Its Own Dynamometer Car

Because the tractive effort is nearly proportional to the current flowing through the motors regardless of the speed, it is very easy to judge train weights, proper ratings and other things. In fact, every electric locomotive is equipped with its own instruments so that it is a very good dynamometer itself, and in cases where the engineer runs into conditions of overloading, he can readily judge the amount and reduce as necessary. There is no argument as to whether one man can get more out of an engine of this kind than another—they are all placed on an even basis. Moreover, the normal running times are so uniform that the dispatchers, as a general rule, do not have to figure much on the personal element of the enginemen in supervising train operations.

There are possibly other benefits to be derived from electrification, but I have endeavored to stay within the limitations applying to the locomotives alone. There are disadvantages too, of course, and there is a need for improvements and developmental changes as is true of all electrical equipment. However, the field for experiment and such changes is large, and with the successful electric motive power we now have, we have made the start, and further improved features can be inaugurated if necessary.

An Illustration Typical of the Construction Conditions Encountered in Alaska



The Lachine Bridge at Montreal

C. P. R. Soon to Own Fleet Totaling 438,604 Tons

Operates Over 14,000 Miles of Railway, Several Hotels, Etc.— Wide Margin for 10 Per Cent Dividends

LAST DECEMBER the Canadian Pacific sold in the New York market $25,000,000 of its four per cent consolidated debenture stock. In his statement in the annual report for the year, President E. W. Beatty says that the stock was sold "at prices which under the prevailing market conditions were extremely favorable, reflecting the high credit which the company enjoys. The sale of this stock in New York was effected in an eminently satisfactory manner, and although the security was of a character practically unknown among American investors, it received widespread and ready distribution." The C. P. R. stock is, of course, not a stock in the sense that that term is used in this country. It is, rather, a bond, differing from the bond issues of the United States railroads in that it has no definite term but is perpetual. There is a very good reason why the Canadian Pacific securities should have been well received in the New York market. The reason is, of course, the long dividend record of the Canadian Pacific and the respect which must be paid to its able management over an extended period of time.

Connaught Tunnel—Western End

There is no doubt that the New York market had fully in mind also the fact that the C. P. R. was not subjected to 26 months of federal control. Canada had its war problems and they extended over a longer period than our own. The Canadian Pacific naturally had to bear its burdens in as great degree as the country it served but it bore these burdens under its own management. It was not subjected to the fancies of a beneficent railroad administration or made the victim of a wide variety of more or less valuable ideas. Although it did have to contend with higher costs of fuel and material, and, although it did have to meet the same increases in wages as were made in the United States, it retained, on the other hand, its most important asset, its morale. One of the most difficult tasks which has confronted many American railroads since the end of federal control has been the restoration of this important factor. Some have had marked success. The point is, however, that the Canadian Pacific has had the advantage of not having to meet this particular and very serious problem.

Although it cannot be said that 1921 was a markedly prosperous year, the details concerning Canadian Pacific operations as given in the report for the year have an optimistic aspect. The system's revenues totaled $193,021,854 as compared with $216,641,349 in 1920, a decrease of $23,619,494, this decrease reflecting the general business depression, a decrease in passenger fares in January and July and in freight rates in December and a partial crop failure

in some parts of western Canada. The operating expenses, inclusive of taxes totaled $158,820,114 as compared with $183,488,305, a decrease of $24,668,191. The result was a net of $34,201,740 as compared with $33,153,045 in 1920, an increase of $1,048,695. The operating ratio in 1921 was 82.28 as against 84.70 in 1920.

Handled More Grain

The C. P. R. in 1921 handled 23,710,606 tons of freight as compared with 30,160,134 tons in 1920. The ton mileage was 10,811,087,106 as against 13,994,508,975. This indicates a greater decrease in business than is shown in revenues, the reason being that the earnings per ton-mile were 1.19 cents in 1921 and 1.04 cents in 1920. Decreased traffic was shown in lumber, livestock, manufactures, etc., but the grain and flour business showed marked increases. Whereas in 1920 9,144,410 barrels of flour were transported, in 1921 the total was 11,718,510 barrels. The increase in grain traffic was sufficient as to exceed even the record of 1920. In 1918 the system carried 137,000,000 bushels of grain; in 1919, 121,000,000 bushels; in 1920 it suddenly increased this total to 173,000,000 bushels but in 1921 the total exceeded 175,000,000 bushels. However, in view of what we have been hearing about how grain moved through Montreal last year, the increase does not appear so striking as might have been expected.

The optimistic aspect of the C. P. R.'s present situation comes in the ambitious program of improvements which the stockholders are to be asked to approve. It is proposed to make expenditures on capital account "as and when conditions warrant such expenditures" of $10,622,137. The stockholders were asked last year to approve a similar program totaling $4,316,236. The increase to over $10,000,000 this year may be regarded, one trusts, as the C. P. R.'s opinion that prosperity is about to return and as a hint to the present depression that it is about time to withdraw from the scene. The program includes such items as $1,021,700 for "replacement and enlargement of structures in permanent form"; $1,008,200 for "additional stations, round houses, freight sheds, shops, etc."; $1,500,700 for heavier rail; $1,550,000 for the new pier at Vancouver; $1,454,500 for the Chateau Frontenac Hotel, Quebec; $439,000 for machinery at various shops; $218,400 for improvements to plant and machinery at Angus shops; $755,600 for line diversions, etc. The first projects to be given attention are the new pier at Vancouver and the Chateau Frontenac Hotel, both of which are now under way. The road is also about to extend the mileage of its lines. The C. P. R. has entered into an agreement with the government of Alberta relative to the construction and the operation for 25 years of an extension of the Central Canada Railway for 25 miles west from Peace River Landing to Berwyn and has also made a similar agreement with the Province of Quebec for the construction by a Canadian Pacific subsidiary, the Interprovincial & James Bay Railway, of a line from Kipawa to the Des Quinze river, 77 miles.

438,604 Tons of Shipping

A matter of special interest to the United States readers at the present time is the C. P. R. steamship services. It is of interest primarily in view of the pending ship subsidy bill which proposes an amendment to the Panama Canal Act so as to permit railroads to own and operate ocean-going vessels. As this bill receives increased attention there is no question but that one of the first things that will be brought up is the success the C. P. R. has been having with its ship services. The Canadian Pacific operates ships from Montreal to Liverpool and Southampton and from Halifax to Liverpool. On the Pacific it operates a line from Vancouver to Japan, Shanghai, Hongkong and the Philippines and also a line from Vancouver to Australia and New Zealand via the Hawaiian Islands. These activities are expanding, as is evidenced by the additions which are planned for the extensive and up-to-date facilities at Vancouver and by the tonnage of the C. P. R. shipping. At the end of 1920 the total tonnage inclusive of coastwise services was 301,219; at the end of 1921 it had increased to 406,754 tons. New vessels building and the recent acquisition of four former German ships will shortly bring the total to 438,604 tons, a fleet which will be noted for its size and for its standard of excellence alike. When it is realized that the C. P. R. itself operates or has under construction 14,784 miles of line; that it also controls the Minneapolis, St. Paul & Sault Ste. Marie, 4,376 miles; the Duluth, South Shore & Atlantic, 621, and the Mineral Range, 101, and is about to bring its fleet to 438,604 gross tons, the real extensiveness of the C. P. R. system will perhaps be the more readily appreciated.

The net earnings of the C. P. R. from railway operations in 1921 were, as above noted, $34,201,740. Fixed charges totaled $11,519,072 and there was $500,000 contributed to the pension fund, leaving $22,182,668 available for dividends. It is the C. P. R.'s practice to pay from its railroad net dividends of four per cent on its preferred stock and seven on its common. After the deduction of these dividends there was a net surplus for the year of $755,392 as compared with $450,359 in 1920. The other three per cent of the total of ten per cent paid on the common is derived from other income. This other income in 1921 totaled $29,567,491, which compared with $26,380,292 in 1920. The net earnings of the ocean and coastal steamship lines totaled $2,785,615, or about the same as in 1920. There was $4,053,386 derived as net earnings from the commercial telegraph and news department, hotels, etc.

CANADIAN PACIFIC OPERATING RESULTS 1912-1921

Year ended June 30	Mileage	Freight revenue	Total Operating revenue	Operating expenses	Net operating revenue	Oprating ratio	Revenue tons	Revenue ton miles	Revenue tons per mile of road	Revenue train load	Revenue car load
1912	10,983	$79,833,734	$123,319,541	$80,021,298	$43,298,243	64.89	25,940,238	10,391,650,965	945.519	372	18.30
1913	11,602	89,655,223	139,395,700	93,149,826	46,245,874	66.82	29,471,814	11,470,001,871	989,081	381	19.34
1914	12,044	81,135,295	129,814,824	87,388,896	42,425,928	67.32	27,801,217	10,821,748,859	896,470	407	20.15
1915	12,917	60,737,737	98,865,210	65,290,582	33,574,628	66.04	21,490,596	7,940,151,342	625,338	411	19.13
1916	12,994	89,654,405	129,481,886	80,255,965	49,225,921	61.98	29,276,872	14,057,685,773	1,070,068	503	22.90
Year ended Dec. 31											
1916	12,989	96,454,896	139,729,687	89,253,188	50,476,499	63.88	30,168,798	14,931,739,090	1,133,343	519	22.87
1917	13,389	103,635,795	152,389,335	105,843,317	46,546,018	69.46	31,198,685	14,882,991,224	1,129,908	539	23.77
1918	13,389	110,187,288	157,537,698	123,035,310	34,502,388	78.10	29,856,694	13,014,665,922	991,680	530	23.90
1919	13,389	111,064,442	176,929,060	143,996,024	32,933,036	81.39	25,102,821	11,121,322,012	840,928	498	22.08
1920	13,402	145,303,400	216,641,349	183,488,305	33,153,044	84.70	30,160,134	13,994,508,975	1,066,401	529	23.44
1921	13,444	128,849,446	193,021,854	158,820,114	34,201,740	82.28	23,710,606	10,811,087,106	818,743	519	24.21

THIRTEEN HUNDRED EMPLOYEES of the Chicago, Burlington & Quincy general offices at Chicago went to work on March 21, a little over five days after flames devastated the building. During the days following the fire, plasterers, bricklayers and carpenters worked incessantly to repair the damage caused by the flames and water. All offices in the building from the first to the eighth floor are now occupied and all departments are operating.

More Railroads Object to Train Control Order

Varied Reasons for Using Money Elsewhere—Pere Marquette to Experiment with Clark's Wireless

THE INTERSTATE COMMERCE COMMISSION continued, at Washington, on Thursday, March 23, its hearing on the reasons for and against the issuance of its proposed order requiring the extensive installation of automatic train control apparatus, reported in the *Railway Age* last week, pages 783 and 787. Statements were presented by the St. Louis-San Francisco, the Pere Marquette, the Chesapeake & Ohio, the Chicago, Milwaukee & St. Paul and other roads; and by two manufacturers.

The hearing was continued on Friday, at the close of which it was announced that other proprietors of train control devices would be heard on April 12.

J. C. Mills, signal superintendent of the Chicago, Milwaukee & St. Paul, asked that the commission postpone any order as to his road. The company is now under orders of states and municipalities for grade crossing separation and other safety work to the amount of $13,000,000. When Commissioner Esch asked if this would not be spread over a period of years, he said that the date for the completion of the work had already passed, as the authorities had allowed it to be deferred from time to time; and it was now necessary to finish the work as rapidly as possible. The company cannot get the capital for automatic train control apparatus in addition to the heavy expenditures now required.

H. R. Safford, vice-president of the Chicago, Burlington & Quincy, said his company desired to indicate its sympathetic interest in train control development and to express the hope that investigations may continue aggressively, but he did not believe the ramp type would prove satisfactory. The problem of getting an impulse from the roadside apparatus to the locomotive is a detail yet to be perfected. Chairman McChord asked him to file with the commission a statement of the costs in property damage and personal injury damages of train accidents on the Burlington during the last 10 years which might have been prevented by an automatic train control.

A. W. Smith, superintendent of the Hagerstown division of the Western Maryland, asked that his company be relieved of the order, on the ground that there is practically no passenger traffic over the division contemplated by the order, only one passenger train each way a day and a maximum of nine freight trains. He said that there had been no loss of life in this territory as the result of a train accident in six years or since the installation of automatic signals. If the money were available the company should extend its signal installation before spending the money for train control.

C. J. Kelloway, superintendent of signals of the Atlantic Coast Line, declared it impracticable to install train control with wayside signals. If a cab signal were used it would distract the attention of the engineman from the lookout. He submitted an estimate of the cost of equipping 120 miles of road with a "continuous control" apparatus, the type which the Pennsylvania proposes to install, based on estimates furnished by the Union Switch & Signal Company. This covered 242 miles of track and 251 blocks and the equipment of 12 passenger, 18 freight and 13 extra locomotives, a total of $315,785. Mr. Borland asked why he had used estimates for the continuous control type when the intermittent induction type would be cheaper. Mr. Kelloway replied that he understood that the continuous control type was the only one that would meet the specifications of the commission. He understood that intermittent induction apparatus would not meet the specifications of the commission on a number of points, but when Chairman McChord asked him to point them out, he hesitated; and finally said that he assumed that No. 5 calls for continuous control; but Mr. Borland said that it did not. Mr. Borland thought that an intermittent type, either ramp or induction, would meet the conditions of the Atlantic Coast Line, to which Mr. Kelloway replied that in the opinion of signal engineers the continuous control type is better and that if the road is going to make an installation the best is none too good.

The Erie's Uses for Its Money

R. S. Parsons, general manager of the Erie, said that the proposed order apparently requires two installations, one for the Erie and one for the Chicago & Erie. His signal engineer had given estimates that 125 miles on the Chicago & Erie would cost $243,000 or $345 per roadway indication and $1,600 per locomotive; for the Delaware division the cost would be $316,000. He said he did not know what device this estimate covered, but it is impossible to get accurate estimates because the devices are not yet in a marketable condition. It is difficult for the Erie to get money for any purpose. If it had the money it would prefer to complete its double track, which would cost $3,000,000; and there are two divisions on the main line between Chicago and New York not yet equipped with automatic signals. The company is anxious to complete this work and it would cost about the same as the train control installation contemplated by the commission's order. The company would also like to buy some steel passenger cars and complete its stone ballasting; and it is continually embarrassed by state orders for the elimination of grade crossings. It is now under orders of courts and commissions to spend $10,000,000 for this purpose, and some of the work is under contract. He thought the burden of experimenting with train control should be borne by others. Passenger traffic of the Erie is thin, with only two through passenger trains between Chicago and New York and about two local trains each way a day. The company has laid great stress on requiring obedience to signals on the part of its enginemen and every year conducts from 30,000 to 40,000 surprise tests. It is a very rare thing for an engineman to run past a signal except for a short distance. Mr. Parsons said he was not opposed to automatic stops, but the Erie has not for 20 years had a passenger train accident which would have been prevented by one. It has been experimenting with various devices. There is no question but that they stop trains, but many operating problems are involved. If a division were to be equipped now it would undoubtedly have to be changed in two or three years. He recommended that the commission arrange with the American Railway Association to pick one railroad to make a thorough test, the expense of which should be shared by all roads; the Erie would be glad to pay its share.

A. H. Rice, signal engineer of the Delaware & Hudson, asked that the order be not entered as to his road, on the ground that the only satisfactory type would be a continuous induction type, which he thought had not been sufficiently developed. He estimated the cost of the installation at $927,500, for 301 locomotives and apparatus at 104 roadside points.

T. S. Stevens, signal engineer of the Atchison, Topeka & Santa Fe, filed a statement by A. G. Wells, vice-president. The Santa Fe has made no plans for installation, awaiting the commission's final order. The company is ready to stand

its share of the expense of testing any device which the commission or the A. R. A. committee thinks should be tested. Commissioner Lewis said that most of the roads take the position that other work should be done before automatic train control is installed, and asked if the road would make the same plea if automatic train control devices were in a higher stage of development. Mr. Stevens said that for himself he held that the most important thing is signalling.

Charles Stephens, signal engineer of the Chesapeake & Ohio was called to the stand and asked to comment on the report submitted by Mr. Peabody of inspections on the C. & O. He said certain defects referred to would be corrected; others are fundamental, but a way would be found to correct them. He said, however, that the report of the A. R. A. observers did not correspond with the records of the railroad; there are serious discrepancies. He filed a record which he said showed only two clear failures in two years out of 1,200,000 operations, but he admitted that there had been a great deal of difficulty with damaged shoes. This, however, was a question of clearance. The company should not be required to extend its installation at this time because it is necessary to change the location of the shoe on the engines. He believed this would eliminate the shoe trouble, but it would cost about $30,000, which the company is not now in a position to spend.

"Is this a practicable device?" asked Commissioner Lewis.

"It has worked very satisfactorily," replied Mr. Stephens.

"Is it still in the experimental stage?" asked Mr. Lewis.

Mr. Stephens replied in the affirmative. "We are now engaged in re-designing the apparatus."

Commissioner Lewis asked if it unnecessarily slows up the traffic. Mr. Stephens replied in the affirmative, but this can be overcome by a permissive form of speed control. He said that the formation of ice on the shoe or the ramp causes no difficulty; but hard packed snow such as is found in the northwest would probably break off the shoe.

M. E. Miller, representing the Simplex Train Control Company, said that his device had been tested on the Buffalo, Rochester & Pittsburgh, and he asked that a representative of that road who was present be called to state the result of the test. E. W. Kolb, signal engineer of the Buffalo, Rochester & Pittsburgh, expressed reluctance to testify, saying he was present only to get information, but Commissioner McChord insisted that he state the result of the tests. He said the Simplex company had asked for an opportunity to make a test and the road had permitted this to be done on a branch line. Tests were made on two separate days during the last six months with an engine and one car; and the device did all that was claimed for it. It stopped the train. But there was nothing to show how it would work with a longer train. The officers of the road do not approve of the device for it includes insulated sections of track and it would leave part of the track unprotected by the automatic block system. Mr. Miller said the objections could easily be overcome and his company was anxious to get permission from any road to make an installation over several miles at its own expense.

Industrial Development Calls for Varied Expenditures

B. A. Hamilton, vice president in charge of operation of the St. Louis-San Francisco asked that that road be relieved of the proposed order in view of the present expenses confronting it in connection with proposed second main track and grade reduction work. In view of the commercial and industrial development now taking place throughout the southwest he would prefer to use the sum required for automatic train control for other purposes such as new cars and better highway crossing protection. To install train control over 238 miles would cost $312,000. The territory named in the commission's order has an average of 18 trains each way daily. If the commission should not see fit to relieve his road he requested permission to make a combined installation of automatic train control and automatic block signals over the territory from Monett, Mo., to Aston, Oklahoma, a distance of 72 miles, all single track except five miles.

The representative of the Pere Marquette endorsed and adopted the report of the railroads' committee, especially the conclusion. Plans have been made to test the wireless type of train control as developed by T. E. Clark of Detroit. Ten miles of track have been set aside for this purpose near Detroit. It is planned to begin work in 30 days and to equip three or four locomotives. An installation of this apparatus over 150 miles with 65 locomotives would cost probably $260,000. This road made the plea that, in view of this proposed test, it be omitted from any orders. A. L. Grandy, chief engineer of the road, thought that a year to a year and a half would be necessary for satisfactory experiments. A 10-mile installation is sufficient; this road needs its money for automatic signals, interlocking, grade separation, etc. When asked how long it would take to complete these improvements he replied, "at least 10 years." Commissioner McChord asked whether it was the intention of the Pere Marquette to make an extensive installation if this test proved satisfactory, but Mr. Grandy could not say. The commissioners then called his attention to the present good financial showing of the Pere Marquette and asked why such an installation should not be made if the test proved satisfactory.

Cost of the Chesapeake & Ohio Experiments

H. B. Wickham, vice-president and general counsel of the Chesapeake & Ohio, asked that his line be not required to make an installation throughout the entire limit designated in the Commission's order, as with the completion of the installation to Staunton, Va., train control would be in service over 61 miles of road. It had been found necessary to redesign the apparatus and it was still in the experimental and development stage. With the completion of the installation through Staunton, the cost to the railroad company will have been $372,742 with an annual charge of $30,166. For the visual (light) signals the sum of $74,326 was spent. The maintenance on this is estimated at $13,604 a year, making a total installation cost of $447,068 and total annual maintenance charge of $43,770; and he felt that his road had complied with the spirit and intent of the Commission's order.

H. F. Haag, signal engineer of the Kansas City Southern, explained the situation on that road. It does not operate trains of such a character, number, or speed as would bring it properly within the class of the other roads named in the order. It has but four through passenger trains a day, two in each direction, and these are somewhat local in character, averaging approximately 25 miles an hour gross speed. During 1921 only 8.7 freight trains a day were run on the division from Kansas City to Pittsburg, 128 miles; the average train would have about seven meeting or passing points in 122 miles. Railroads running more trains have not been included in the proposed order. The number of collisions which might have been prevented by train control apparatus on the Kansas City Southern has been very small. In the last nine years between Kansas City and Texarkana, 487 miles, there have been only 24 collisions, which show a total property damage of $59,792, and personal injury bills amounting to $114,015; a total cost of $173,807, or an average per year per mile of $39.57. These figures do not include the portion of the cost borne by other roads involved. The trains are operated by the train order system entirely; there is no block system. From Kansas City to Pittsburgh there have been only three accidents in the nine years, involving a total cost of between $10,000 and $11,000. The Kansas City Southern being a comparatively

new railroad, much work of a permanent character remains to be done of a more elementary character than a highly specialized device such as train control. Many improvements which it deems necessary would increase safety as well as economy and efficiency in operation. For instance there are still some timber trestles remaining in the main line, and some of the main track has not yet been ballasted. There are also still a few sags and bad curves which should be eliminated as soon as the company is financially able to do the work. The expenditure necessary to install an automatic train control system on a full passenger division Mr. Haag estimated at $625,000, which he said is beyond the ability of the road to furnish. The estimate is based on equipping 30 locomotives at prices from $400 to $3,000 per locomotive, and from $200 to $1,000 a mile for roadside equipment. It also includes the cost of installing automatic block signals. In reply to questions by Chairman McChord the witness said his estimates were based on figures from five train control companies, from which he had made a weighted average. He was asked to file the detail figures for the record.

J. E. Muhlfeld, consulting engineer, described the physical and operating conditions of the Kansas City Southern, explaining the improvements which should be made as soon as they can be financed, which improvements, in the opinion of the management, should take precedence over any expenditure for train control.

Data Furnished by Train Control Proprietors

In order that representatives of two train control companies on the Pacific Coast need not stay over for the hearing on April 12, the Commission heard them on Friday. F. F. Bostwick of the National Safety Appliance Company, San Francisco and R. L. Miller of the Otis Automatic Train Control Company, Spokane, Wash., presented brief statements and were followed by A. J. Brookins.

Mr. Bostwick emphasized the advantages of the magnetic system, not affected by weather, and said that the last four months' service on the Southern Pacific near Oakland, California, had demonstrated that maintenance cost would be low. His apparatus had been tested by Japanese engineers in Manchuria and Japan, where the weather conditions were satisfactorily met. During these tests the clearance between track element and the engine element was increased to 10 in. and the magnet of a track element had been set off the center 4 in. without harmful result. The track element was also surrounded with iron and the voltage of the track battery was lowered one-half but the device functioned satisfactorily. The engine equipment would have to be cleaned and oiled every three months. The track element had been under water for two weeks at one time but it worked all right. The maximum cost of the locomotive equipment would be $350; and of the track appliances $400 [per block]. The labor of installing the locomotive device would cost $25 and the track installation $175. The additional cost of installing the speed control feature at each magnet location would be probably $150. These prices Mr. Bostwick gave as maximum.

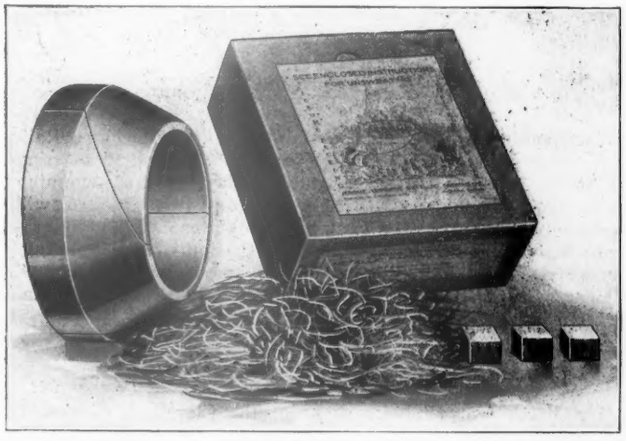
Mr. Brookins said that his device had received the approval of the Bureau of Safety as to its mechanical features. He had attempted to get a trial on the Chicago & Alton and also on the Atchison, Topeka & Sante Fe but had been unable to make any progress.

R. L. Miller said that tests had been made of his apparatus in June, 1920, and February, 1921, on the Canadian Pacific (Spokane International) at Spokane; and since then a number of changes had been made in the device.

M. B. Bulla, of the Bulla Train Control, El Paso, Texas, stated that his device had passed the experimental stage four years ago and that over 100,000 tests had been made over 124 miles of track on the El Paso & Southwestern. His estimated cost was $150 a mile and $200 a locomotive, for blocks from 4,000 ft. to 8,000 ft. long. He further stated that this device had been in operation on one locomotive for six years. When asked why the railroad did not make an installation he said that the road did not want to spend the money at this time, but that he had a verbal agreement whereby his device was to be used if the road should be forced to make an installation.

Solid Packing Rings for King-Type Cups

ONE of the great difficulties encountered in the use of metallic packing rings for King type cups arises from the fact that the packing must be divided into two or three sections. Holding these sections together while boring out the packing is a matter requiring considerable care and there is also a heavy loss of material because of the ease with which the thin edges of the sections become bent or broken in handling between the manufacturer and the point of application. In order that these difficulties may be overcome and that each set of packing may reach the locomotive in perfect condition the Jerome-Edwards Metallic Packing Company, Chicago, has developed and patented a method of packing and delivering Jerome packing for King type cups whereby



Sweated Ring Packed in Carton with Waxed Excelsior

the packing reaches the shop in a solid ring. In the final process of manufacture before the packing is prepared for shipment the three sections of each ring are sweated together and are intended to remain in this condition until the ring has been bored out and is ready for application.

The box in which the ring is packed contains a small quantity of waxed excelsior and three small blocks which support the ring slightly above the bottom of the box. When the ring is ready to apply it is replaced in the box and a match touched to the excelsior, which in burning produces sufficient heat to melt out the solder in the joints without injuring the sections themselves. This requires from three to five minutes, after which the sections fall apart. They are then wiped clean of the fused solder and are ready for application to the rod in perfect condition.

REPRESENTATIVE BECK has introduced in Congress a bill "to provide for the inspection of railroad tracks which are alleged to be inadequately maintained and in unsafe condition and authorizing and requiring the Interstate Commerce Commission to make the necessary investigations and order the employment of additional men."

General News Department

The Full-Crew Law of Maryland has been repealed by the legislature.

The Directors of the Missouri Pacific are still considering a tentative budget of $6,000,000, chargeable to capital account, for improvements to roadway and existing equipment.

The Interstate Commerce Commission has sent to the Senate committee on interstate commerce an unfavorable report on the bill, introduced by Senator Cummins, to require the railroads to run their trains on "summer" time.

A Mass Meeting will be held in Sweetwater, Texas, on April 10, under the auspices of the West Texas Chamber of Commerce, to discuss the means of saving the Kansas City, Mexico & Orient from being abandoned, as is now threatened.

The Superpower System will be the subject of a paper presented in two parts by Henry Flood, Jr., and L. E. Imlay, at the spring convention of the American Institute of Electrical Engineers, to be held at the Drake Hotel, Chicago, April 19-21, 1922.

The Interstate Commerce Commission has denied the application of the Norfolk Southern for authority for its officers and directors to hold positions with other carriers in so far as it relates to the holding by C. McD. Carr of the positions of director of the Durham & Southern and of the Norfolk Southern.

The Savannah Sectional Committee of the American Railway Association, Signal Section, will hold its fourth meeting at Ansley Hotel, Atlanta, Ga., on Thursday, April 6, beginning at 10 a. m. V. Pagett, of Mudge & Company, Chicago, will speak on railroad motor cars, their maintenance and operation; and there will be a general discussion of rail bonding. Informal reports are expected from members who visited Chicago on the occasion of the March meeting of the Signal Section in that city.

Big Four Reopens Shops Under Contract

The Beech Grove (Ind.) shops of the Cleveland, Cincinnati, Chicago & St. Louis, have been reopened for operation under contract by the Railway Service & Supply Corporation. The shops had been closed for more than a month.

Chicago Car Foreman's Association to Meet

The Car Foreman's Association of Chicago will meet on April 10 at the Great Northern Hotel in that city, at which time a paper entitled, "Transferring of Bad Order Cars" will be presented by J. A. Deppe, assistant to the master car builder of the Chicago, Milwaukee & St. Paul, at Milwaukee, Wis.

Power Brake Hearing Postponed

The Interstate Commerce Commission has postponed from April 6 to May 17 its hearing at Washington in connection with its investigation of power brakes and appliances; and the time-limit of its order requiring the carriers to furnish certain information regarding power brakes and appliances has been extended from April 1 to May 1.

Contents of Burlington Vaults Saved from Fire

When the steel vaults in the office building of the Chicago, Burlington & Quincy in Chicago were opened on March 21, six days after the disastrous fire of March 15, it was found that the documents, maps and records in them were uninjured. While all of the maps and blueprints in the offices of the engineering and mechanical departments other than those contained in the vaults were destroyed, marked progress has already been made in duplicating these records from prints received from outlying points.

"The Spirit of Transportation"

With the above title as the principal inspiration, the Clark Equipment Company, Buchanan, Mich., a concern which deals in automobile parts, offers a prize of $1,000 for an ode on transportation and has appointed a committee to judge the manuscripts received. Last year the Clark company gathered twelve paintings by famous artists, each depicting the artist's own conception of "The Spirit of Transportation." It is now proposed to publish reproductions of the pictures, accompanied by a poem or ode on the same theme.

New York-New Jersey Tunnel

The tunnel from Canal street, Manhattan, New York City, to Henderson street, Jersey City, for highway traffic, is to begin in about six weeks. This tunnel is being built by the joint action of the states of New York and New Jersey. The New York Legislature has passed the principal appropriation bill for $5,500,000; and on March 28 the commissions in charge of the work, at a joint session in New York City, awarded the contract for construction to the Booth & Flinn Company, of New York and Pittsburgh, at $19,330,000.

Conductor and Engineman Imprisoned

Charles L. Evans, conductor and Walter Yeakle, engineman, convicted in court at Norristown, Pa., in February, for responsibility for the disastrous collision on the Philadelphia & Reading near Woodmont, on December 5, were on March 20 sent to jail, Evans for nine months and Yeakle for six months; each also being fined $500 and costs. A petition, said to have been signed by 5,000 persons, asked the court to suspend the sentences, but Judge Swartz after considering the petition for a half hour, said that to grant it would be a shirking of his duty.

Revenues and Expenses For February

A preliminary compilation of reports of revenues and expenses filed with the Interstate Commerce Commission for February by 137 Class I roads shows net operating income of $37,647,000 as against a deficit of $10,364,000 for those roads in February last year. The total operating revenues increased two-tenths of 1 per cent, while operating expenses show a reduction of 16.2 per cent. In the Eastern district there was an increase in revenues of 4 per cent, while in the Western district there was a decrease of 7.3 per cent and in the Southern of 2.5 per cent. On the basis of these returns, it is roughly estimated that the roads will show a return at the rate of approximately 4 per cent per annum for February.

Railway Development Association of the Southeast

This association held its third annual meeting at Atlanta, Ga., on February 22 and 23, with President Jesse M. Jones in the chair.

Most or all of the members of this association belong also to the American Railway Development Association and the discussions at the meetings were largely on topics which have been considered at recent meetings of the national association.

The members were unanimous in the opinion that the discontinuance of cotton raising should be resisted, while at the same time other cash crops, such as sweet potatoes, hogs, and dairy products ought to be encouraged. All agreed that carpet grass ought to be introduced extensively in the South, with a view to the promotion of the raising of live stock and the extension of pastures. A law to promote national

reclamation was favored. A number of instances were reported where two or more railroads in competitive territory have been working in unison to help the farmers.

The officers elected for the ensuing year were: President, J. F. Jackson (C. Ga.); senior vice-president, W. R. Tucker (A. B. & A.); agricultural vice-president, H. B. Holroyd (L. & N.); industrial vice-president, E. S. Center (A. & W. P.); immigration vice-president, E. D. Mays (S. A. L.); secretary, H. S. McLendon (F. E. C.), St. Augustine, Fla.

Railroad Meeting of Virginian Section A. S. M. E.

The Virginian Section of the American Society of Mechanical Engineers will hold a meeting at Newport News on April 7 and 8 at which engineering problems pertaining to locomotives and cars will be discussed. The subjects of the papers and the authors are as follows: Locomotive Operation, John A. Pilcher, mechanical engineer, Norfolk & Western; Car Design, L. E. Endsley, University of Pittsburgh; Truck Design, George A. Boyden. A paper on The Modern Trend of Locomotive Design will be presented, the name of the author not being available at this time.

Transportation Division of A. R. A. to Meet in Chicago

The annual session of the Transportation division of the American Railway Association will meet at the Blackstone Hotel, Chicago, on Wednesday, April 19. The business before this meeting will be the consideration of, and action upon, the reports of the committees on car service; demurrage; storage, reconsignment and diversion; freight handling service; railroad business mail and records. In view of the importance of the reports to be considered, it is expected that there will be a full discussion on all of the subjects presented and members have been requested to come prepared for a possible two-day session. All car accounting and transportation officers are urged to be present.

Railway Business Association

President Alba B. Johnson, of the Railway Business Association announces that for three-year terms he has reappointed as members of the general executive committee W. E. Clow, Chicago, president James B. Clow & Sons; G. F. Downs, Buffalo, president Lackawanna Steel Co.; E. J. Kearney, Milwaukee, secretary Kearney Trecker Co.; E. B. Leigh, Chicago, president Chicago Railway Equipment Co.; Herbert I. Lord, Detroit, vice-president Detroit Lubricator Co.; William E. Sharp, Chicago, president Grip Nut Co.; and has appointed the following three new members: J. M. Davis, New York, president Manning, Maxwell & Moore; J. E. Galvin, Lima, Ohio, president Ohio Steel Foundry Co.; Samuel M. Hastings, Chicago, president Dayton Scale Co.

Administration Gives Up Efforts to Avert Coal Strike

The strike of coal miners called for April 1 was one of the principal subjects discussed at the cabinet meeting on Friday, March 24, but it was stated later at the White House that the administration had practically given up hope of averting a strike by its efforts to bring the labor leaders and the operators into a conference. It was pointed out in this connection that while recently the operators have refused to go into a general conference, last October when the administration, through Secretary Hoover, tried to take steps to forestall a strike, the union leaders were unwilling to confer. It was indicated that the administration expects to find some way to act to prevent a shortage of coal. President Harding is very much interested in seeing the cost of coal reduced by a lowering of the cost of production and also of the cost of transportation. He takes the position that because of the excess capacity of the mines the cost of production could be reduced by a development of coal exports which at present are out of the question because of the high level of wages and freight rates.

Operating officers of the eastern coal-carrying roads held a meeting at the office of the Car Service Division of the American Railway Association at Washington on March 28 to consider plans for diverting coal during the period of the strike.

The Bureau of the Census and the Geological Survey have prepared jointly a report on stocks of coal as of March 1, which shows that on that date consumers had in storage approximately 52,500,000 tons of soft coal. By April 1, considering the rate at which coal has been leaving the mines recently, it is estimated that this reserve will have increased to at least 63,000,000 tons. At the rate of consumption prevailing in January and February, the reserve on March 1 was sufficient to last 43 days if evenly divided, which approximates the maximum stocks on hand at the end of the war. In addition, there were 5,160,000 tons on the upper lake docks and a further reserve of at least 674,000 tons was held in storage by the purchasers of coal either at the mines or intermediate points. The American Railway Association has supplied information as to the quantity of coal held by the carriers on March 1 for railroad use. The roads already heard from had a total of 14,850,000 tons and it was expected that complete reports would show over 16,000,000 tons. As the largest stocks on record in the past were 13,640,000 tons on January 1, 1919, it will be seen that the railroads have accumulated what is for them an enormous reserve of coal, sufficient to last on the average 42 days at the present rate of consumption. The stocks on the day of the armistice were sufficient for only 31 days, part of the difference being due to the greater requirements of the roads at that time.

Strike on Western Maryland

Shopmen and trackmen on the Western Maryland struck on Saturday, March 25, against the action of the railroad in dismissing them and leaving them to work for contractors. According to press dispatches, considerable numbers left their work at Baltimore, Hagerstown and Cumberland, Md.; Elkins, W. Va., and Connellsville, Pa. Most of the work in these departments on the Western Maryland is now in the hands of contractors, the Dickson Construction & Repair Company, of Youngstown, Ohio, and the strikers are nearly all employees of this concern. Representatives of the contractors said, at Baltimore, on the 27th, that there was difficulty in filling the places of the strikers and that they would not be taken back. On the evening of the 28th, reports from Hagerstown said that there had been some rioting in the yards there, when non-union men were set at work.

Shopmen on the Western Maryland have the full authority and sanction of their union to go on strike, according to B. M. Jewell, president of the Railway Employees Department of the American Federation of Labor. The proper vote and compliance with union laws were fulfilled before the men walked out.

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

AIR BRAKE ASSOCIATION.—F. M. Nellis, 165 Broadway, New York City. Next meeting, May 9-12, 1922, Hotel Washington, Washington, D. C. Exhibit by Air Brake Appliance Association.

AIR BRAKE APPLIANCE ASSOCIATION.—J. F. Gettrust, The Ashton Valve Company, 318 W. Washington St., Chicago. Meeting with Air Brake Association.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontious, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—L. A. Stone, C. & E. I. Ry., Chicago. Annual meeting, Oct. 17-20, San Francisco, Cal.

AMERICAN ASSOCIATION OF ENGINEERS.—C. E. Drayer, 63 E. Adams St., Chicago.

AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.—E. L. Duncan, 332 So. Michigan Ave., Chicago. Next meeting, June 28 and 29, Minneapolis, Minn.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York. Next meeting, Nov. 21-22, Pinehurst, N. C.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothschild, Room 400, Union Station, St. Louis, Mo. Next convention, August 23-25, 1922, Kansas City, Mo.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—J. W. Welsh, 8 W. 40th St., New York.

AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.—C. Borcherdt, 202 North Hamlin Ave., Chicago, Ill.

AMERICAN RAILWAY ASSOCIATION.—J. E. Fairbanks, General Secretary, 75 Church St., New York, N. Y. Annual meeting, November, 1922.
Division I—Operating.
Freight Station Section (including former activities of American Association of Freight Agents). R. O. Wells, Freight Agent, Illinois Central Railroad, Chicago, Ill.
Medical and Surgical Section. J. C. Caviston, 75 Church St., New York.

(*Continued on Page* 844)

Operating Statistics of Large Steam Roads—Selected Items for the Month of January, 1922,

FREIGHT SERVICE

Region, road and year	Average miles of road operated	Train-miles	Locomotive-miles: Principal and helper	Locomotive-miles: Light	Car-miles: Loaded (thousands)	Car-miles: Per cent loaded	Ton-miles (thousands): Gross. Excluding locomotive and tender	Ton-miles (thousands): Net. Revenue and non-revenue	Average number of locomotives on line daily: Serviceable	Unserviceable	Per cent unserviceable	Stored
New England Region:												
Boston & Albany 1922	394	238,710	257,117	29,015	4,126	67.4	208,163	79,101	116	26	18.4	...
1921	394	283,241	304,355	37,136	4,332	60.4	251,783	103,349	130	27	17.4	...
Boston & Maine 1922	2,455	501,151	557,917	46,248	10,001	70.9	505,214	205,736	313	142	31.1	42
1921	2,469	567,686	627,338	56,855	9,975	63.4	589,409	252,966	346	115	25.0	38
N. Y., N. H. & H. 1922	1,960	412,009	449,330	28,847	9,463	67.8	472,958	192,282	284	84	22.9	29
1921	1,959	436,893	473,641	38,280	8,403	61.6	484,137	206,517	298	76	20.3	25
Great Lakes Region:												
Delaware & Hudson 1922	887	337,920	441,219	28,993	7,603	61.4	506,335	248,323	261	45	14.7	101
1921	880	408,358	576,872	38,846	9,137	56.9	659,894	325,459	267	45	14.4	42
Del., Lack. & Western 1922	994	482,442	599,691	119,924	13,244	67.7	709,371	317,459	295	68	18.7	25
1921	995	502,621	616,140	123,124	13,130	64.0	778,318	361,381	354	71	16.7	17
Erie (inc. Chic. & Erie) 1922	2,259	953,967	1,067,001	45,179	27,857	68.3	1,654,273	786,475	569	196	25.7	78
1921	2,259	1,000,452	1,135,065	39,879	26,295	58.6	1,781,364	842,354	577	125	17.8	62
Lehigh Valley 1922	1,430	531,838	596,868	66,602	14,161	63.4	862,151	395,383	439	106	19.4	131
1921	1,431	556,761	618,246	54,427	13,154	60.1	859,737	409,125	381	199	34.3	86
Michigan Central 1922	1,827	475,183	483,113	19,052	12,941	61.9	712,478	267,761	318	92	22.4	80
1921	1,829	455,837	468,655	17,135	11,538	54.9	712,708	289,905	301	95	24.0	94
New York Central 1922	5,655	1,773,920	1,976,112	138,388	56,474	62.3	3,270,695	1,385,395	1,099	509	31.7	320
1921	5,646	2,061,483	2,313,436	178,334	55,295	51.8	3,752,700	1,570,840	1,073	527	33.0	82
N. Y., Chic. & St. L. 1922	572	339,833	341,636	575	10,062	62.7	542,985	208,335	120	36	23.1	45
1921	572	399,135	403,061	1,526	9,596	57.8	557,817	217,424	107	55	34.1	19
Pere Marquette 1922	2,191	289,994	293,643	5,707	6,712	64.4	403,335	179,206	155	51	24.7	27
1921	2,207	285,093	292,914	4,534	5,798	58.7	321,412	140,594	171	35	17.2	25
Pitts. & Lake Erie 1922	228	88,775	93,931	726	2,915	63.2	205,212	117,334	56	20	26.0	15
1921	225	134,371	147,291	1,965	3,635	59.0	277,393	155,877	66	10	13.4	9
Wabash 1922	2,418	589,402	621,956	7,217	14,855	68.8	812,761	357,747	273	67	19.7	26
1921	2,418	610,807	630,239	6,263	13,873	64.6	805,568	357,405	275	61	18.1	15
Ohio-Indiana-Allegheny Region:												
Baltimore & Ohio 1922	5,235	1,576,690	1,827,735	140,493	37,483	63.5	2,336,650	1,147,283	951	449	32.1	183
1921	5,185	1,903,582	2,415,493	137,434	39,913	52.8	2,888,905	1,342,938	1,065	265	19.9	108
Central of N. J. 1922	685	281,777	312,970	37,607	5,346	56.2	373,572	180,919	214	42	16.6	16
1921	678	290,690	314,531	29,616	5,376	56.2	384,136	190,804	200	64	24.4	7
Chicago & Eastern Ill. 1922	945	217,167	218,673	3,487	5,082	61.3	318,469	160,360	123	48	28.0	45
1921	1,131	281,154	283,905	3,771	5,824	55.8	397,675	195,893	115	62	35.0	2
C., C., C., & St. L. 1922	2,387	649,968	684,264	4,549	16,908	58.9	1,082,457	477,500	317	130	29.0	47
1921	2,396	720,354	748,756	896	16,438	52.1	1,169,602	515,335	306	113	26.9	15
Elgin, Joliet & Eastern 1922	840	99,743	111,074	8,592	2,791	65.0	211,416	112,316	100	8	7.6	29
1921	837	149,636	165,919	11,978	3,963	64.1	316,487	175,171	95	9	8.4	4
Long Island 1922	395	39,896	43,777	7,491	443	61.7	24,723	9,385	37	10	20.5	1
1921	395	40,533	47,472	7,806	459	64.7	24,721	9,874	35	7	16.0	1
Pennsylvania System 1922	10,882	4,032,130	4,394,908	324,887	95,287	63.9	6,390,195	3,170,730	2,526	951	27.4	619
1921	10,869	4,752,971	5,279,204	417,624	100,286	56.2	7,420,395	3,692,430	2,210	897	28.9	136
Phila. & Reading 1922	1,119	530,494	593,162	73,466	11,628	61.4	796,324	412,637	377	68	15.3	160
1921	1,119	614,672	706,907	94,776	13,366	56.3	985,403	515,012	314	84	21.1	39
Pocahontas Region:												
Chesapeake & Ohio 1922	2,548	718,978	794,585	19,163	19,517	58.0	1,530,399	830,276	460	104	18.4	115
1921	2,530	767,697	843,475	22,408	18,843	51.8	1,542,522	800,310	400	147	26.9	36
Norfolk & Western 1922	2,228	718,507	869,708	32,890	18,890	58.6	1,461,613	799,747	615	95	13.3	232
1921	2,210	814,383	994,789	37,927	19,752	55.0	1,652,856	892,402	502	175	25.8	101
Southern Region:												
Atlantic Coast Line 1922	4,924	592,738	599,057	8,372	12,913	61.8	669,682	243,418	291	120	29.2	29
1921	4,889	672,415	677,921	11,936	13,038	57.2	744,930	278,831	281	122	30.1	...
Central of Georgia 1922	1,908	183,986	184,583	2,367	3,964	72.1	197,334	85,937	112	23	16.8	14
1921	1,908	229,535	230,676	2,451	4,152	65.5	243,217	115,206	112	22	16.4	...
I. C. (inc. Y. & M. V.) 1922	6,151	1,633,658	1,642,365	37,249	40,673	61.3	2,636,791	1,222,603	749	83	9.9	28
1921	6,151	1,950,244	1,963,356	40,256	41,769	56.7	2,950,185	1,350,198	710	109	13.3	4
Louisville & Nashville 1922	5,021	1,378,942	1,457,093	55,571	23,744	59.8	1,557,362	737,688	586	88	13.1	67
1921	5,026	1,552,210	1,669,489	57,443	23,611	58.5	1,589,882	758,822	534	115	17.7	3
Seaboard Air Line 1922	3,537	384,224	392,236	7,099	9,011	65.5	420,213	159,515	173	71	29.2	...
1921	3,537	437,707	446,356	9,086	8,613	61.7	485,233	188,034	171	91	34.7	...
Southern Ry. 1922	6,942	1,143,868	1,163,648	28,198	23,851	65.9	1,268,507	520,394	860	245	22.1	23
1921	6,942	1,213,989	1,240,853	26,820	22,712	62.3	1,316,007	563,179	896	232	20.6	3
Northwestern Region:												
C. & N. W. 1922	8,459	1,536,885	1,582,085	23,228	28,776	60.9	1,732,361	754,610	813	220	21.3	66
1921	8,320	1,714,444	1,761,132	22,369	28,349	54.9	1,807,164	767,033	661	293	30.7	...
C., M. & St. P.[1] 1922	11,027	1,539,592	1,588,433	66,362	34,010	66.5	1,915,295	899,243	834	230	21.6	132
1921	10,603	1,412,041	1,451,167	74,680	28,923	57.7	1,727,797	741,414	677	360	34.7	58
C., St. P., M. & O. 1922	1,726	315,114	338,917	14,535	5,224	64.1	292,768	121,771	148	64	30.3	25
1921	1,726	313,251	329,804	13,027	4,194	62.5	288,634	118,802	142	59	29.4	20
Great Northern 1922	8,265	703,170	726,472	26,861	16,951	69.6	970,928	469,461	581	172	22.8	200
1921	8,171	661,708	678,701	25,662	13,974	66.2	814,611	383,785	575	196	25.5	205
M., St. P. & S. Ste. M. 1922	4,384	402,066	435,818	6,761	8,097	71.2	407,583	187,224	344	60	14.9	42
1921	4,225	482,307	516,931	7,074	9,320	63.1	538,932	248,555	336	75	18.3	36
Northern Pacific 1922	6,416	718,862	751,333	49,345	18,631	72.3	1,039,770	504,786	554	138	20.0	106
1921	6,408	617,287	649,113	43,692	15,317	72.3	860,999	424,868	545	138	20.2	138
Oreg.-Wash. R. R. & Nav. 1922	2,166	174,557	208,220	26,311	4,235	75.0	236,735	117,192	126	41	24.6	5
1921	2,196	184,810	200,797	22,876	3,957	73.2	219,546	109,642	120	36	23.2	...
Central Western Region:												
Atch., Top. & Santa Fe 1922	9,806	1,281,648	1,344,211	61,417	31,769	66.3	1,741,557	656,331	777	177	18.6	211
1921	9,771	1,656,949	1,740,589	86,529	33,606	50.7	2,255,024	813,981	664	253	27.6	25
Chicago & Alton 1922	1,010	350,468	356,306	6,178	6,915	59.8	443,419	197,184	121	42	25.9	14
1921	1,010	341,688	348,318	6,615	6,106	53.0	419,949	176,933	122	42	25.7	4
Chic., Burl. & Quincy 1922	9,326	1,520,881	1,596,174	78,970	36,797	60.9	2,278,264	1,062,570	686	268	28.1	98
1921	9,322	1,692,809	1,773,693	86,507	37,689	54.9	2,560,124	1,187,707	680	248	26.7	32
Chic., Rock Isl. & Pacific 1922	7,662	1,272,677	1,294,487	9,594	25,459	66.7	1,402,963	611,337	586	165	22.0	75
1921	7,662	1,336,272	1,365,718	18,228	25,350	62.9	1,461,979	642,840	564	195	25.7	18
Denver & Rio Grande West'n. 1922	2,593	213,646	262,820	50,652	4,345	63.7	265,179	123,819	245	64	20.7	45
1921	2,585	250,032	311,010	58,740	4,783	63.3	299,080	147,597	218	86	28.3	15
Oregon Short Line 1922	2,367	309,217	320,578	21,550	6,773	67.5	422,256	207,378	160	66	29.3	29
1921	2,359	273,245	285,545	23,720	5,655	64.6	353,081	171,076	173	46	21.0	19
Southern Pacific 1922	6,974	901,274	1,033,465	187,424	24,874	66.6	1,396,617	569,935	549	195	26.2	45
1921	6,975	1,059,785	1,203,821	217,393	24,334	58.1	1,502,392	589,892	521	172	24.9	7
Union Pacific 1922	3,665	791,013	802,983	37,189	20,545	59.9	1,256,669	538,977	411	143	25.7	65
1921	3,614	963,847	986,087	74,474	21,446	72.6	1,146,935	512,010	408	129	24.0	100
Southwestern Region:												
Gulf, Colo. & Santa Fe 1922	1,895	193,429	198,615	4,701	4,630	62.7	272,619	116,060	123	31	20.1	36
1921	1,895	268,822	275,687	5,750	5,888	60.0	356,761	155,272	100	41	29.1	...
Missouri, Kans. & Tex. 1922	1,668	199,440	199,458	7,732	5,123	60.1	295,717	116,454	140	42	22.9	75
1921	1,710	274,677	274,723	6,944	5,976	49.9	399,803	150,142	137	53	27.7	35
Mo., Kans. & Tex. of Tex. 1922	1,738	195,513	199,907	1,876	3,700	59.0	223,435	88,371	88	43	32.9	18
1921	1,740	269,184	273,849	3,196	4,832	56.4	308,117	126,607	108	43	28.4	15
Missouri Pacific 1922	7,264	1,032,064	1,043,852	31,236	23,526	65.8	1,370,234	617,306	419	164	28.2	17
1921	7,261	1,161,180	1,168,375	36,051	23,210	61.6	1,448,121	655,597	377	182	32.6	2
St. Louis-San Francisco 1922	4,761	689,502	698,762	11,742	12,009	63.2	689,933	291,913	340	120	26.1	32
1921	4,761	829,325	841,972	15,841	12,286	55.5	780,601	321,185	376	133	26.1	20
Southern Pacific Lines (in Texas and Louisiana)[2] 1922	3,710	533,298	534,087	4,698	9,897	60.9	611,672	258,618	197	105	34.7	11
1921	3,647	681,744	692,779	4,685	11,766	54.1	800,594	332,821	191	96	33.4	1
Texas & Pacific 1922	1,953	285,725	285,884	2,182	6,023	60.9	342,946	126,004	118	82	41.2	13
1921	1,947	371,249	371,249	5,342	7,256	58.7	439,371	170,268	119	69	36.7	...

[1] No passenger-train service.
[2] S. S. Co., and Texas & New Orleans.

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

Compared with January, 1921, for Roads with Annual Operating Revenues above $25,000,000.

Region, road and year	Avg. No. of freight cars on line daily: Home	Foreign	Total	Per cent unserviceable	Stored	Gross tons per train, excluding locomotive and tender	Net tons per train	Net tons per loaded car	Net ton-miles per car-day	Car-miles per car-day	Net-ton miles per mile of road per day	Lb. coal per 1,000 gross ton-miles, including locomotive and tender	Passenger Service: Train-miles	Passenger-train car-miles
New England Region:														
Boston & Albany	1922 3,930	4,018	7,948	5.9	1,620	872	331	19.2	321	24.9	6,477	244	308,959	1,966,074
	1921 2,646	5,342	7,988	6.8	960	889	365	23.9	417	29.0	8,463	238	317,570	2,016,895
Boston & Maine	1922 17,190	13,021	30,211	19.6	1,148	1,008	411	20.6	220	15.1	2,703	178	803,616	4,312,724
	1921 13,790	17,957	31,747	13.5	1,541	1,038	446	25.4	257	16.0	3,305	180	855,596	4,494,166
N. Y., N. H. & H	1922 24,771	14,027	38,798	22.8	3,529	1,148	467	20.3	160	11.6	3,165	196	1,108,617	6,175,373
	1921 19,738	19,508	39,246	13.0	3,052	1,108	473	24.6	170	11.2	3,401	207	1,082,636	6,570,190
Great Lakes Region:														
Delaware & Hudson	1922 11,595	4,952	16,547	8.5	537	1,498	735	32.7	484	24.1	9,031	222	190,522	962,655
	1921 7,852	9,596	17,448	8.0	.....	1,616	797	35.6	602	29.7	11,925	217	185,493	963,898
Del., Lack. & Western	1922 19,084	5,865	24,949	13.5	.....	1,470	658	24.0	410	25.3	10,302	232	493,071	3,393,238
	1921 14,407	8,880	23,287	7.4	2,481	1,549	719	27.5	501	28.4	11,721	212	491,293	3,500,317
Erie (inc. Chic. & Erie)	1922 42,826	16,759	59,585	20.1	11,297	1,734	824	28.2	426	22.1	11,232	171	662,585	4,598,344
	1921 24,624	27,276	51,900	9.2	8,199	1,780	842	32.0	524	27.9	12,030	182	685,922	4,728,375
Lehigh Valley	1922 32,705	8,853	41,558	12.9	4,783	1,621	743	27.9	307	17.3	8,916	195	346,236	2,491,639
	1921 23,830	13,810	37,640	10.3	3,034	1,544	735	31.1	351	18.8	9,225	205	378,009	2,776,408
Michigan Central	1922 21,190	12,727	33,917	16.6	7,067	1,499	563	20.7	255	19.9	4,729	152	555,853	4,833,698
	1921 14,156	14,486	28,642	8.8	4,327	1,564	636	25.1	327	23.7	5,112	156	589,041	4,993,748
New York Central	1922 90,888	45,155	136,043	19.8	22,431	1,844	781	24.5	329	21.5	7,903	142	2,419,005	18,686,797
	1921 62,622	79,342	141,964	8.4	14,070	1,820	762	28.4	357	24.2	8,974	163	2,453,122	18,689,902
N. Y., Chic. & St. L	1922 5,699	4,499	10,198	7.3	2,791	1,598	613	20.7	659	50.8	11,753	125	88,116	489,555
	1921 4,238	6,124	10,362	10.0	520	1,398	545	22.7	677	51.6	12,264	137	88,142	507,653
Pere Marquette	1922 12,001	7,373	19,374	17.8	1,500	1,391	618	26.7	298	17.3	2,638	144	273,074	1,328,712
	1921 8,838	8,665	17,503	7.3	1,500	1,127	525	25.8	276	18.2	2,186	201	287,689	1,403,217
Pitts. & Lake Erie	1922 20,188	6,778	26,966	47.4	1,489	2,312	1,322	40.3	140	5.5	16,607	88	109,849	549,590
	1921 8,797	14,601	23,398	12.9	2,018	2,064	1,160	42.9	215	8.5	22,384	92	115,705	586,536
Wabash	1922 13,365	8,480	21,845	14.6	709	1,379	607	24.1	528	31.9	4,773	185	526,533	2,721,741
	1921 10,860	13,633	24,493	10.8	636	1,319	585	25.8	471	28.3	4,768	201	552,806	2,782,020
Ohio-Indiana-Allegheny Region:														
Baltimore & Ohio	1922 74,452	25,171	99,623	14.3	12,369	1,482	728	30.6	371	19.1	7,069	212	1,394,155	8,437,024
	1921 55,241	51,376	106,617	6.8	4,196	1,518	705	33.6	406	22.9	8,356	225	1,382,179	8,590,573
Central of N. J	1922 21,613	6,632	28,245	6.2	9,553	1,326	642	33.8	207	10.9	8,523	201	324,338	1,533,427
	1921 12,741	13,533	26,274	18.9	1,840	1,321	656	35.5	234	11.7	9,072	223	315,930	1,380,005
Chicago & Eastern Ill	1922 16,830	2,823	19,653	13.6	3,660	1,466	738	31.6	263	13.6	5,473	195	220,446	1,456,292
	1921 10,263	5,363	15,626	14.8	.....	1,414	697	33.7	404	21.5	5,587	198	240,075	1,532,779
C., C., C. & St. L	1922 19,445	16,575	36,020	12.0	3,538	1,665	735	28.2	428	25.7	6,454	154	685,139	4,250,146
	1921 12,800	21,626	34,426	11.1	6,861	1,624	715	31.4	483	29.5	6,937	174	769,609	4,543,237
Elgin, Joliet & Eastern	1922 10,744	2,647	13,391	9.9	1,178	2,119	1,126	40.2	271	10.3	4,315	165	(1)	(1)
	1921 9,271	7,126	16,397	8.8	438	2,115	1,171	44.2	345	12.2	6,751	150	(1)	(1)
Long Island	1922 2,240	2,950	5,190	5.5	389	620	235	21.2	58	4.5	767	420	189,916	1,020,413
	1921 1,283	3,385	4,668	4.6	247	610	244	21.5	68	4.9	807	424	189,621	1,037,611
Pennsylvania System	1922 222,493	60,692	283,185	11.7	69,620	1,585	786	33.3	361	17.0	9,400	164	5,093,414	32,751,218
	1921 167,509	107,234	274,743	3.9	49,870	1,561	777	36.8	434	20.9	10,959	184	5,252,783	34,321,130
Phila. & Reading	1922 27,730	10,727	38,457	4.8	4,073	1,501	778	35.5	346	15.9	11,894	217	491,188	2,228,119
	1921 18,508	18,530	37,038	8.9	.....	1,603	838	38.5	449	20.7	14,850	225	521,189	2,358,648
Pocahontas Region:														
Chesapeake & Ohio	1922 38,953	9,712	48,665	12.1	4,123	2,129	1,155	42.5	550	22.3	10,511	148	440,511	2,423,867
	1921 26,977	22,048	49,025	6.9	11,500	2,009	1,043	42.5	527	24.0	8,016	163	446,963	2,501,203
Norfolk & Western	1922 34,895	5,203	40,098	6.1	5,819	2,034	1,113	42.3	643	25.9	11,580	189	403,509	2,423,597
	1921 27,751	14,479	42,230	6.3	4,715	2,030	1,096	45.2	682	27.5	13,027	188	404,277	2,609,470
Southern Region:														
Atlantic Coast Line	1922 24,148	7,791	31,939	13.2	.....	1,130	411	18.9	246	21.1	1,595	142	858,846	6,058,173
	1921 20,124	14,087	34,211	10.3	.....	1,108	415	21.4	263	21.5	1,840	157	885,316	6,303,050
Central of Georgia	1922 4,869	2,191	7,060	17.4	.....	1,073	467	21.7	393	25.1	1,453	162	320,806	1,720,455
	1921 3,426	3,882	7,308	14.8	750	1,060	502	27.7	509	28.0	1,948	181	327,053	1,715,034
I. C. (inc. Y. & M. V.)	1922 47,614	18,920	66,534	7.0	10,715	1,614	748	30.1	593	32.2	6,411	161	1,442,930	8,354,201
	1921 33,354	28,406	61,760	5.6	3,660	1,513	692	32.3	705	38.5	7,080	162	1,437,486	8,328,697
Louisville & Nashville	1922 40,557	10,294	50,851	14.6	99	1,129	535	31.1	468	25.2	4,739	185	1,032,441	5,855,888
	1921 29,930	23,817	53,747	16.7	112	1,024	488	32.1	455	24.2	4,870	212	960,785	5,564,836
Seaboard Air Line	1922 12,958	7,565	20,523	30.8	.....	1,094	415	19.9	251	19.2	1,455	201	641,385	4,032,352
	1921 9,190	10,944	20,134	12.3	.....	1,109	430	21.8	301	22.4	1,715	204	622,652	3,690,522
Southern Ry	1922 42,385	16,790	59,175	15.5	5,664	1,109	455	21.8	284	19.7	2,418	222	1,309,441	7,634,995
	1921 23,453	28,283	51,736	4.2	12,431	1,084	464	24.8	351	22.7	2,616	232	1,478,840	9,184,751
Northwestern Region:														
C. & N. W	1922 48,589	22,776	71,365	6.0	7,000	1,127	491	26.2	341	21.4	2,878	208	1,592,850	9,487,407
	1921 44,379	28,848	73,227	8.2	4,000	1,054	447	27.1	338	22.7	2,974	222	1,704,861	10,177,895
C., M. & St. P.[1]	1922 50,965	20,325	71,290	17.0	.....	1,244	584	26.4	407	23.1	2,631	193	1,463,689	8,614,238
	1921 36,303	27,822	64,125	8.2	6,600	1,224	525	25.6	373	25.2	2,256	196	1,459,399	8,933,495
C., St. D., M. & O	1922 3,450	9,594	13,044	13.6	2,242	929	386	23.3	301	20.2	2,276	203	307,347	1,706,024
	1921 3,084	9,568	12,652	12.3	1,223	921	379	24.2	303	20.1	2,220	221	319,713	1,808,052
Great Northern	1922 47,244	5,358	52,602	10.7	.....	1,381	668	27.7	283	14.9	1,832	199	988,056	5,601,667
	1921 39,449	16,273	55,722	9.5	.....	1,231	580	27.5	222	12.2	1,515	214	1,001,927	5,974,081
M., St. P. & S. Ste. M	1922 19,779	4,003	23,782	11.4	1,475	1,014	466	23.1	254	15.4	1,378	169	422,095	2,335,664
	1921 15,074	9,313	24,387	9.1	1,856	1,117	515	26.7	329	19.6	1,898	151	436,056	2,326,697
Northern Pacific	1922 38,155	7,950	46,105	8.6	3,200	1,446	702	27.1	353	18.0	2,538	160	843,410	5,204,325
	1921 31,795	16,060	47,855	8.6	2,843	1,395	688	27.7	286	14.3	2,139	168	847,508	5,313,491
Oreg.-Wash. R. R. & Nav	1922 5,115	3,651	8,766	2.4	3,907	1,283	635	27.7	431	20.8	1,745	265	258,738	1,639,934
	1921 3,603	5,049	8,652	8.1	3,682	1,188	593	27.7	409	20.2	1,611	248	262,446	1,765,459
Central Western Region:														
Atch., Top. & Santa Fe	1922 49,794	11,331	61,125	7.2	11,975	1,359	512	20.7	346	25.3	2,159	170	1,767,138	13,214,571
	1921 44,771	22,091	66,862	9.0	11,413	1,361	491	24.2	393	32.0	2,687	174	2,020,229	14,692,947
Chicago & Alton	1922 9,894	4,912	14,806	3.9	931	1,265	563	28.5	430	25.2	6,296	214	276,055	1,588,871
	1921 6,693	8,793	15,486	4.2	50	1,229	518	29.0	369	24.0	5,650	232	307,823	1,726,949
Chic., Burl. & Quincy	1922 49,123	15,074	64,197	8.7	275	1,498	699	28.9	534	30.3	3,675	186	1,481,755	9,228,433
	1921 39,459	29,258	68,717	9.1	.....	1,512	702	31.5	558	32.2	4,110	190	1,527,745	9,840,101
Chic., Rock Isl. & Pacific	1922 36,920	12,569	49,489	9.3	9,102	1,102	480	24.0	398	24.9	2,574	203	1,296,129	7,261,979
	1921 28,142	25,314	53,456	9.4	9,773	1,094	481	25.4	388	24.3	2,707	205	1,332,599	7,898,289
Denver & Rio Grande Western	1922 13,197	2,508	15,705	9.8	2,677	1,241	580	28.5	254	14.0	1,540	238	228,642	1,450,045
	1921 10,472	5,246	15,718	7.3	1,500	1,196	500	30.9	303	15.5	1,842	264	229,274	1,528,821
Oregon Short Line	1922 7,744	3,695	11,439	6.4	1,752	1,366	671	30.6	585	28.3	2,826	167	285,849	1,961,570
	1921 6,455	6,288	12,743	4.0	5,483	1,292	626	30.3	433	22.2	2,339	169	302,757	2,122,522
Southern Pacific	1922 23,468	18,174	41,642	5.6	6,694	1,550	622	22.6	434	28.8	2,594	170	1,318,496	10,351,814
	1921 16,125	26,509	42,634	7.8	1,588	1,418	557	24.2	446	31.6	2,728	177	1,539,513	11,891,023
Union Pacific	1922 19,168	5,465	24,633	10.4	6,048	1,450	647	23.9	671	38.7	4,506	179	849,735	6,609,034
	1921 14,762	12,654	27,416	12.5	3,651	1,304	559	26.2	634	40.3	4,811	206	903,411	7,433,730
Southwestern Region:														
Gulf, Colo. & Santa Fe	1922 9,067	3,303	12,370	2.9	2,146	1,409	600	25.1	303	19.2	1,976	151	194,532	1,078,376
	1921 6,345	5,875	12,220	4.3	2,816	1,327	578	26.4	410	25.9	2,645	162	196,498	1,185,333
Missouri, Kans. & Tex	1922 7,805	6,286	14,091	6.1	5,490	1,483	584	22.7	267	19.5	2,253	160	270,534	1,899,752
	1921 7,261	6,857	14,118	1.5	2,600	1,456	547	25.1	343	27.4	2,832	167	299,710	2,200,864
Mo., Kans. & Tex. of Tex	1922 354	11,777	12,131	5.9	3,570	1,143	452	23.9	235	16.7	1,640	179	269,520	1,600,423
	1921 235	12,540	12,775	3.8	372	1,145	470	26.2	320	21.6	2,347	174	290,005	1,962,394
Missouri Pacific	1922 34,938	17,259	52,197	9.5	4,434	1,328	598	26.2	381	22.1	2,742	180	951,501	5,502,135
	1921 23,704	28,465	52,169	6.8	2,371	1,247	565	28.2	405	23.3	2,912	178	945,456	5,549,270
St. Louis-San Francisco	1922 21,794	7,097	28,891	8.7	.....	1,001	423	24.3	326	21.2	1,978	213	751,456	4,178,392
	1921 16,162	16,359	32,521	4.7	.....	941	387	26.1	319	22.0	2,176	241	789,091	4,490,492
Southern Pacific Lines (in Texas and Louisiana)[2]	1922 9,672	15,025	24,697	13.0	2,696	1,147	485	26.1	338	21.2	2,248	150	540,347	3,504,903
	1921 5,341	22,122	27,463	9.3	2,642	1,174	488	28.3	391	25.6	2,944	150	544,485	3,601,099
Texas & Pacific	1922 6,554	5,757	12,311	16.9	.....	1,200	441	20.9	330	25.9	2,082	164	298,108	1,918,217
	1921 4,288	9,426	13,714	9.9	.....	1,183	459	23.5	401	29.1	2,822	166	322,315	2,121,406

[1]Includes Chicago, Terre Haute & Southeastern from July 1, 1921, only. [2]Includes G. H. & S. A., Houston & Shreveport, H. & T. C., Houston, East & West Texas, Iberia & Vermilion, Lake Charles & Northern, Louisiana Western, Morgan's La. & Tex. and T. & N. O.

(*Continued from page* 841)

Protective Section (including former activities of the American Railway Chief Special Agents and Chiefs of Police Association), J. C. Caviston, 75 Church St., New York, N. Y.

Telegraph and Telephone Section (including former activities of the Association of Railway Telegraph Superintendents). W. A. Fairbanks, 75 Church St., New York, N. Y. Annual meeting, September 20-22, 1922, Colorado Springs, Colo.

Safety Section. J. C. Caviston, 75 Church St., New York.

Division II—Transportation (including former activities of the Association of Transportation and Car Accounting Officers). G. W. Covert, 431 South Dearborn St., Chicago, Ill.

Division III—Traffic, J. Gottschalk, 143 Liberty St., New York.

Division IV—Engineering, E. H. Fritch, 431 South Dearborn St., Chicago, Ill. Exhibit by National Railway Appliances Association.

Construction and Maintenance Section. E. H. Fritch.

Electrical Section. E. H. Fritch.

Signal Section (including former activities of the Railway Signal Association). H. S. Balliet, 75 Church St., New York, N. Y. Next meeting, March 13 and 14, Drake Hotel, Chicago. Annual meeting, June 14-16, 1922, Monmouth Hotel, Spring Lake, N. J.

Division V—Mechanical (including former activities of the Master Car Builders' Association and the American Railway Master Mechanics' Association). V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill. Annual convention, June 14-21, 1922, Atlantic City, N. J. Exhibit by Railway Supply Manufacturers' Association.

Equipment Painting Section (including former activities of the Master Car and Locomotive Painters' Association). V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill.

Division VI—Purchases and Stores (including former activities of the Railway Storekeepers' Association). J. P. Murphy, General Store Keeper, New York Central, Collinwood, Ohio. Annual meeting, June 19-21, 1922, Hotel Traymore, Atlantic City, N. J.

Division VII—Freight Claims (including former activities of the Freight Claim Association). Lewis Pilcher, 431 South Dearborn St., Chicago, Ill.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Chicago. Next convention, October 17-19, 1922, Cincinnati, Ohio. Exhibit by Bridge and Building Supply Men's Association.

AMERICAN RAILWAY DEVELOPMENT ASSOCIATION.—J. F. Jackson, C. of Ga. Ry., Savannah, Ga. Annual meeting, May 10-12, 1922, Denver, Colo.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—(Works in co-operation with the American Railway Association, Division IV.) E. H. Fritch, 431 South Dearborn St., Chicago. Exhibit by National Railway Appliances Association.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—(See American Railway Association, Division 5.)

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—R. D. Fletcher, 1145 East Marquette Road, Chicago. Exhibit by Supply Association of the American Railway Tool Foremen's Association.

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whittelsey, Union Trust Bldg., Washington, D. C. Annual meeting, May 10, Washington, D. C.

AMERICAN SOCIETY FOR STEEL TREATING.—W. H. Eiseman, 4600 Prospect Ave., Cleveland, Ohio. Sectional meeting, May 25-26, Bureau of Mines Auditorium, Pittsburgh, Pa. Annual convention, Oct. 2-7, 1922, General Motors Building, Detroit, Mich.

AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa. Annual meeting, June 26-30, 1922, Chalfonte-Haddon Hall, Atlantic City, N. J.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—E. M. Chandler (acting secretary), 33 W. 39th St., New York. Regular meetings 1st and 3d Wednesdays in month, except July and August, 33 W. 39th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Next meeting, May 8-11, Atlanta, Ga.

Railroad Division, A. F. Stuebing, Managing Editor, Railway Mechanical Engineer, Woolworth Bldg., New York. Next meeting, May 16, 1922, 29 W. 39th St., New York.

AMERICAN TRAIN DISPATCHERS ASSOCIATION.—C. L. Darling, 1310-1311 Mallers Bldg., Chicago, Ill. Next convention, June 18, 1923, Chicago.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—George M. Hunt, Chemist, Forest Products Laboratory, Madison, Wis. Next meeting, January 23, 1923, New Orleans, La.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—H. D. Morris, Northern Pacific R. R., St. Paul, Minn. Next meeting, May 17-19, 1922, Montreal.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Next meeting, June 19, Dennis Hotel, Atlantic City, N. J. Exhibit by Railway Electrical Supply Manufacturers' Association.

ASSOCIATION OF RAILWAY EXECUTIVES.—Thomas De Witt Cuyler (chairman), 61 Broadway, New York, N. Y.

ASSOCIATION OF RAILWAY SUPPLY MEN.—A. W. Clokey, 1658 McCormick Bldg., Chicago. Meeting with International Railway General Foremen's Association.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—(See American Railway Association, Division I.)

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—(See American Railway Association, Division II.)

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—D. J. Higgins, American Valve & Meter Company, 332 S. Michigan Ave., Chicago. Meeting with convention of American Railway Bridge and Building Assn.

CANADIAN RAILWAY CLUB.—W. A. Booth, 53 Rushbrooke St., Montreal, Que.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS, MO.—Thomas B. Koeneke, 604 Federal Reserve Bank Bldg., St. Louis, Mo. Meetings, first Tuesday in month at the American Hotel Annex, St. Louis.

CENTRAL RAILWAY CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Regular meetings, 2d Thursday in January, March, May, September and November, Hotel Iroquois, Buffalo, N. Y.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—W. P. Elliott, Terminal Railroad Association of St. Louis, East St. Louis, Ill.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.—D. B. Wright, 34th St. and Artesan Ave., Chicago, Ill. Meeting with Chief Interchange Car Inspectors' and Car Foremen's Association.

CINCINNATI RAILROAD CLUB.—W. C. Cooder, Union Central Bldg., Cincinnati, Ohio. Meetings, 2d Tuesday in February, May, September and November.

EASTERN RAILROAD ASSOCIATION.—E. N. Bessling, 614 F St., N. W., Washington, D. C. Annual meeting May 11, 1922, Railroad Club of New York.

FREIGHT CLAIM ASSOCIATION.—(See American Railway Association, Division VII.)

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—C. H. Treichel, Grand Central Station, Chicago. Regular meetings, Wednesday preceding 3d Friday in month, Room 1414, Manhattan Bldg., Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich. Exhibit by International Railroad Master Blacksmiths' Supply Men's Association.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' SUPPLY MEN'S ASSOCIATION.—George P. White, 747 Railway Exchange, Chicago. Meeting with International Railroad Master Blacksmiths' Association.

INTERNATIONAL RAILWAY ASSOCIATION.—(President), V. Tondelier, President Belgian State Railway System, Brussels. Next congress, April 18-30, Fine Arts Exposition Palace, Rome, Italy.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. G. Crawford, 702 E. 51st St., Chicago. Next annual meeting May 22-25, 1922, Auditorium Hotel, Chicago. Exhibit by International Railway Supply Men's Association.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabasha Ave., Winona, Minn.

INTERNATIONAL RAILWAY SUPPLY MEN'S ASSOCIATION.—C. W. Sullivan, Garlock Packing Co., 326 W. Madison St., Chicago. Meeting with International Railway Fuel Association.

MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION.—E. E. Martin, Union Pacific R. R., Room No. 19, Union Pacific Bldg., Kansas City, Mo. Annual convention, 1922, Buffalo, N. Y.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 26 Cortlandt St., New York. Next convention, May 23-26, 1923, Hotel Sherman, Chicago.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION.—(See A. R. A., Division V.)

MASTER CAR BUILDERS' ASSOCIATION.—(See A. R., Division V.)

NATIONAL ASSOCIATION OF RAILWAY TIE PRODUCERS.—Warren C. Nixon, Western Tie & Timber Co., 905 Syndicate Trust Bldg., St. Louis, Mo.

NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES COMMISSIONERS.—James B. Walker, 49 Lafayette St., New York. Next convention, September 26, 1922, Detroit, Mich.

NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Hanover Square, New York. Next convention, May 10-12, Philadelphia, Pa.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—C. W. Kelly, People's Gas Bldg., Chicago. Annual exhibition at convention of American Railway Engineering Association.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting June, July, August and September.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Regular meetings, 3d Friday in month, except June, July and August, at 29 W. 39th St., New York.

PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meetings, 2d Thursday in month, alternately in San Francisco and Oakland.

RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, 1116 Woodward Building, Washington, D. C. Annual meeting, June 7, 1922, Hotel Cleveland, Cleveland, Ohio.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 600 Liberty Bldg., Broad and Chestnut Sts., Philadelphia, Pa. Annual dinner, February 1, Waldorf-Astoria, New York.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, Fort Pitt Hotel, Pittsburgh, Pa.

RAILWAY DEVELOPMENT ASSOCIATION.—(See Am. Ry. Development Assn.)

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.

RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—R. J. Himmelright, 17 East 42nd St., New York. Meeting with Traveling Engineers' Association.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.

RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, C. & O. Ry., Richmond, Va. Next meeting, October 10-13, 1922, Pittsburgh, Pa.

RAILWAY SIGNAL ASSOCIATION.—(See A. R. A., Division IV., Signal Section.)

RAILWAY STOREKEEPERS' ASSOCIATION.—(See A. R. A., Division VI.)

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Meeting with A. R. A., Division V.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 30 Church St., New York.

RAILWAY TREASURY OFFICERS ASSOCIATION.—L. W. Cox, Commercial Trust Bldg., Philadelphia, Pa.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill. Annual convention, September 19-21, 1922, Hotel Statler, Cleveland, Ohio. Exhibit by Track Supply Association.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, Sunbeam Electric Manufacturing Company, New York City. Meeting with American Railway Association, Signal Section.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, Western Ry. of Ala., Atlanta, Ga.

SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—H. S. White, 9 N. Jefferson St., Chicago.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meets with Roadmasters' and Maintenance of Way Association.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, Marine Trust Building, Buffalo, N. Y. Exhibit by Railway Equipment Manufacturers' Association.

WESTERN RAILWAY CLUB.—Bruce V. Crandall, 14 E. Jackson Boulevard, Chicago. Regular meetings, 3d Monday each month except June, July and August.

Traffic News

C. B. Rader has been reappointed secretary and traffic commissioner of the Denver Grain Exchange Association of Denver, Colo.

The National Railways of Mexico announce that first class passenger fares have been increased 16 2/3 per cent, and second class fares 20 per cent.

The Pennsylvania has announced reduced round trip excursion tickets from Chicago to Washington, D. C., at $38.90, to be on sale on April 24, May 29, and June 26. The tickets will be good for one week and will be honored on all trains with the exception of the Broadway Limited.

The Chicago, Burlington & Quincy recently announced a 25 per cent reduction in its dining car prices, and has in addition, inaugurated a new system of table d'hote meals, offering six combination breakfasts, ranging in prices from 40 cents to one dollar; a dollar luncheon; and a dinner for $1.25. A la carte service will be continued.

At a meeting of the Southeastern Passenger Association held in February, it was announced that the United Confederate Veterans would be given a one way rate for the round trip to their annual reunion at Richmond, Va. This brought such a storm of protests from the veterans that it has since been decided to place the old cent a mile rate in effect.

Coal Production

The demand for soft coal slackened perceptibly during the week of March 18, according to the weekly bulletin of the Geological Survey, and production declined from 11,115,000 to 10,784,000 net tons. It is estimated, however, that this so exceeded consumption as to provide nearly 2,500,000 tons to be added to consumers' stock piles. How much is in storage will not be accurately known until the forthcoming report on stocks is issued.

More States' Rights Bills

Senator Ladd has introduced in Congress a bill to define commerce and establish when an article or commodity is in interstate commerce and when subject to the laws of a state. It provides that "no article of commerce shall be deemed to be in interstate commerce or subject to the federal control or jurisdiction until the same shall have been loaded for shipment and the bill of lading provided for its transportation beyond the borders of the said state and until such time it shall remain subject to the laws of the state. Any article or product shipped from one state to another and billed to its destination shall cease to be treated as in interstate commerce when at the said destination it is unloaded or removed from the system or means of transportation employed in conveying said article or product and shall then be subject to the provisions of the state laws."

Representative McClintic has also introduced a bill to amend sections 402, 406 and 416 of the interstate commerce act "for the purpose of restoring to state commissions certain jurisdiction exercised over intrastate questions prior to the war with Germany."

Representative Bacharach of New Jersey has also introduced a bill by which federal courts would be prohibited from considering actions at law to suspend or restrain the enforcement of orders by state regulating authorities under state laws.

The House committee on interstate and foreign commerce is continuing its hearings on the Sweet bill, at which a number of state commissioners and John E. Benton, general solicitor of the National Association of Railway and Utilities Commissioners, have been heard to advocate the amendment of provisions of the transportation act, recently sustained by the Supreme Court, under which orders of state commissions have been nullified because of discrimination against interstate commerce.

Freight Commodity Statistics for 1921

The Interstate Commerce Commission has issued a statement showing the freight tonnage transported by Class I steam railways for the year ended December 31, 1921. The figures in this statement will not agree with the corresponding totals of the four quarters already published; mainly for the reason that for the first quarter the report of the New York Central did not include the tonnage transported over the Boston & Albany, and also on account of corrections in the first three quarterly reports of the New York, New Haven & Hartford resulting from the transfer from "Tonnage originated" to "Tonnage received from connecting carriers" of certain shipments of cotton, anthracite coal, and bituminous coal received at tidewater.

The following is a comparison, by general classes of commodities, of the tonnage transported in 1920 with that transported in 1921:

Classes of Commodities	Number of Tons Originated — Year ended Dec. 31, 1920	Year ended Dec. 31, 1921	Percent of decrease 1921 from 1920
Products of agriculture	110,839,554	114,016,652	*2.87
Animals and products	26,594,856	24,273,370	8.73
Products of mines	712,154,458	510,860,112	28.27
Products of forests	100,765,537	76,922,790	23.66
Manufactures and miscellaneous	251,864,290	172,176,614	31.64
Merchandise—All L. C. L. traffic	53,202,296	42,079,815	20.91
Total	1,255,420,991	940,329,353	25.10
	Total Tons Carried		
Products of agriculture	220,049,724	222,722,672	*1.21
Animals and products	44,853,503	41,794,508	6.82
Products of mines	1,209,097,673	878,645,798	27.33
Products of forests	195,579,878	148,138,456	24.26
Manufactures and miscellaneous	494,556,078	333,150,182	32.64
Merchandise—All L. C. L. traffic	89,901,495	67,165,435	25.29
Total (1)	2,259,983,278	1,691,617,051	25.15

* Increase.
(1) Includes 5,944,927 tons for which distribution by classes of commodities was not furnished.

New England Division Order Modified

The Interstate Commerce Commission has issued a modification of its order in the New England division's case, dealing with the rates of the Boston & Albany, which was a defendant. The order now provides that of the joint class rates and of the joint commodity rates which are divided on the same basis as are applied to joint class rates, between points on defendants' lines, other than the lines of the Boston & Albany of which the New York Central is lessee, and points on complainants' (New England) lines, other than the lines of complainant the Bangor & Aroostook, complainants shall receive, on and after April 1, 1922, divisions which shall be not less than 115 per cent of their present divisions, except in cases where their present divisions or their present divisions plus those of the Boston & Albany where it participates in the traffic as an intermediate carrier, are greater than the divisions now accruing to defendants, other than the Boston & Albany, in which cases complainants shall receive divisions which shall be not less than:

(1) Where the Boston & Albany does not so participate in the traffic, their present divisions plus 15 per cent of the present divisions accruing to defendants.

(2) Where the Boston & Albany does so participate in the traffic, their present divisions plus that proportion of such 15 per cent as their present divisions may be of the total of their present divisions and the division of the Boston & Albany.

The several carriers, other than the complainants and the Boston & Albany participating therein shall receive on and after April 1, the amounts remaining of said joint rates after deducting the divisions so to be received by complainants and the present divisions of the Boston & Albany where it participates in the traffic, such amounts so remaining to be divided among such other carriers in the same ratio as their present divisions respectively bear to each other, or otherwise as they may agree, or failing such agreement, as may be determined by the commission upon application therefor.

It is provided, however, that the first month for which the carriers will be required to state and make their current accounts and settlements in accordance with this order will be the month of June, 1922; the accounts and settlements for the months of April and May, 1922, in accordance with this order, may be stated and made at any time up to August 1, 1922.

Commission and Court News

Interstate Commerce Commission

The Interstate Commerce Commission has vacated its order of suspension of proposed proportional rates representing reductions from Chicago and related points to South Atlantic and Gulf ports for application on traffic consigned to the Pacific coast by steamship lines operating through the Panama Canal.

The Interstate Commerce Commission has reopened the case in which it reduced rates on grain, hay and grain products in the West, to the extent necessary for consideration of a petition filed by the carriers in which they allege that the order of November 21 includes a portion of Illinois territory not embraced within the issues in the proceeding and ask that the order be modified. The petition is assigned for hearing at Chicago on April 10 before Examiner Barclay.

The commission has suspended, July 23, the operation of certain schedules published in supplements to Agent F. A. Leland's tariffs which propose to establish proportional rates on grain from Sioux City, Iowa, to stations in Louisiana and Texas, uniformly five cents higher than the proportional rate on the same commodities from Omaha, Neb., to same destinations. At the present time there are no through proportional or reshipping rates on grain from Sioux City.

The commission has suspended from March 31 to July 29 the operation of schedules which propose the cancellation of the present provisions for the application of an estimated weight of 7.4 pounds per gallon and the substitution therefor of provisions of the application actual weight per gallon applicable on crude or fuel oil in tank cars from Kansas, Missouri, Oklahoma and Texas to Arizona and New Mexico, also to Cananea, Mexico.

Western Coal Rates

The commission has ordered an investigation to determine whether the rates on coal from producing points in the states of Montana, Wyoming, Colorado and New Mexico and all states west thereof, to destinations in the said states, or any of them, and to El Paso, Texas, are unjustly discriminatory or otherwise in violation of law.

State Commissions

The Southern Pacific and the San Diego & Arizona have petitioned the Railroad Commission of California to approve an agreement covering the joint use of locomotives and shop facilities of the Southern Pacific at Calexico, Cal., and the joint use of the Southern Pacific main line between El Centro and Calexico.

The Public Service Commission of Oregon recently examined the rules and practices under which the Oregon-Washington Railroad & Navigation Company operates trains through its Peninsula tunnel, near St. Johns Junction, Portland, Ore. This investigation was brought about by an accident in the tunnel on December 25, last, resulting in one death and the partial suffocation of other members of a train crew. The commission finds that the practices, service and facilities are unsafe and do not afford adequate protection to the health and safety of employees and passengers. It is held that the staff section, the limits of which include the track through the tunnel, should be extended so that trains will be insured a clear track of not less than 2,000 ft. on either end; the elbow device (deflector) must be placed on all engines operating regularly through the tunnel; respirators must be furnished to all enginemen operating through the tunnel; no train order shall be issued at either of the staff houses, except in emergencies; and an engineering study must be filed with the commission detailing the feasibility of artificial ventilation by shafts, forced draft or other suitable means.

Labor Board Decisions

Clerk Receives Pay Benefit of Outside Experience

A case was presented to the Labor Board with respect to a woman who entered the service of the St. Louis-San Francisco on July 16, 1920, as a general clerk in the car accountant's office at Springfield, Mo. The employees contend that she had been employed previously in clerical work of a similar nature and was, therefore, entitled to the rate paid clerks of more than one year's experience. The carrier took the position that she did not have one or more year's experience in railroad clerical work or that of a similar nature and was not, therefore, entitled to the rate for clerks of one or more years' experience. The position of the employees was sustained.—*Decision* 783.

Dispatcher Permitted to Hold Seniority Rights While Working Extra on Another Division

A train dispatcher on the St. Louis division of the Chicago, Rock Island & Pacific was transferred temporarily to the Kansas division to relieve the chief dispatcher, assistant chief dispatcher and trick dispatcher while they were taking their vacations. It was the contention of the American Dispatchers' Association that this man, by accepting service on the Kansas division, lost his seniority rights as a dispatcher on the St. Louis division and that the action of the carrier in permitting him to return to the St. Louis division was in violation of rules. The carrier contended that at the time the transfer was made dispatchers were considered as officers and that this man was permitted to accept temporary promotion rather than to employ a dispatcher from the outside who was not familiar with the system of dispatching in vogue. The Labor Board denied the claim of the employees.—*Decision No.* 781.

Yard Checker Entitled to Exercise Seniority Rights for Call Boy's Position

A position as yard checker was abolished by the Lehigh Valley incident to a reduction in force. The employee holding this position sought to exercise his seniority rights to displace an employee holding the position of caller. The road declined his request on the ground that he did not possess sufficient fitness and ability to qualify for this position. The Labor Board decided that as he had filled the position of yard checker satisfactorily he had demonstrated his fitness and ability to justify his assignment as a call boy and ordered that he be given that position and reimbursed for all monetary loss incurred since the date he made application for the position, less any amount earned in other employment since that date.—*Decision No.* 735.

Differential Rates Allowed for Positions of Varying Importance

The express foreman at the Western Maryland station at Cumberland, Md., received $10 a month less than the express foreman at the Baltimore & Ohio station at that place. The employees contended that the two men were performing the same class of work and that the disparity in wages constituted a discrimination which should be adjusted in accordance with Section b, Article 1, of Supplement 19 to General Order No. 27, U. S. R. A., which provides for the equalization of rates of pay for the same work at the same agency or upon the same messenger run. The carrier contended that the equalization of wages of employees performing the same work at the same agency emphasized that the work must be the same and this, it maintained was in this case not true; for the Western Maryland station at Cumberland was a comparatively unimportant station office whereas that of the Baltimore & Ohio was a large and important one. The Board upheld the carrier in its contention that the work was not the same and decided against the employees.—*Decision No.* 698.

Foreign Railway News

Chile Buys German Rails

The Chilean State Railways have contracted with Stinnes and Krupp interests for 13,000 tons of steel rail, according to the Wall Street Journal. Terms of payment have evidently not been decided, because it is said that Chile is seeking to pay in nitrates and that the Germans are resisting this.

Italy Cancels Order for German Locomotives

The Italian government has announced, according to dispatches to the New York Herald, that it is cancelling in part its orders for 300 locomotives to be built in Germany and charged to Germany's reparations accounts to Italy. It is understood that this cancellation was due largely to the dissatisfaction of Italian industries which felt that they were being discriminated against.

Argentina to Build Railway in Bolivia

The Argentine government has signed an agreement with the Bolivian government for the construction of a railway in Bolivia, on the understanding that Bolivia can purchase at any time she desires, according to Modern Transport (London). The road will cross the border at Yacuiba and will connect with the Argentine State Railways, and tap territory in eastern Bolivia, from which it is expected Argentina will be able to draw valuable raw materials. The development of petroleum fields in eastern Bolivia is expected to be one important result of the undertaking.

Exports of Car Wheels and Axles in December

Exports of car wheels and axles in December totaled $102,880 in value. Totals by countries, as compiled by the Bureau of Foreign and Domestic Commerce, follow:

Countries	Dollars	Countries	Dollars
Canada	9,754	China	37,200
Honduras	1,265	Japan	16,408
Mexico	10,706	British South Africa	4,228
Cuba	4,301	Other Countries	638
Dominican Republic	700		
Brazil	4,554	TOTAL	102,880
Colombia	13,126		

December Locomotive Exports

In December 65 locomotives, valued at $2,178,620, were exported from this country. Of these 26 went to Mexico and 30 to Argentina. Totals by countries as compiled by the Bureau of Foreign and Domestic Commerce, follow:

Countries	Number	Dollars
Mexico	26	556,900
Jamaica	1	3,000
Cuba	1	10,580
Argentina	30	1,368,000
Chile	5	225,000
Japan	2	15,140
Total	65	2,178,620

Military Control Cuts Chinese Road's Revenues

During the closing quarter of 1921 the earnings of the Peking-Hankow Railway were greatly reduced by the taking over of the lower end of the line by military officials, according to Commerce Reports. This greatly reduces the railway's capacity to meet its commitments, which have during the past year been increased considerably through purchases of additional equipment. It may also deter the awarding of the contract for the Yellow River bridge, designs and proposals for which were considered during the summer by a special board of foreign experts retained by the Chinese railways for the purpose.

Losses of New Zealand's Government Railways

The New Zealand Government Railways are losing £1,000,000 per annum, according to the Times (London) Trade Supplement. Rates have been reduced recently, but train service has been severely curtailed and employees reduced to the minimum. One cause of heavy expense is said to be the small sums spent recently in carrying out needed improvements. Some £4,000,000 will be needed to bring about these improvements. It is pointed out that the government is not pledged to making its purchases in Britain, but that as a matter of practice it does so, even paying higher prices where necessary.

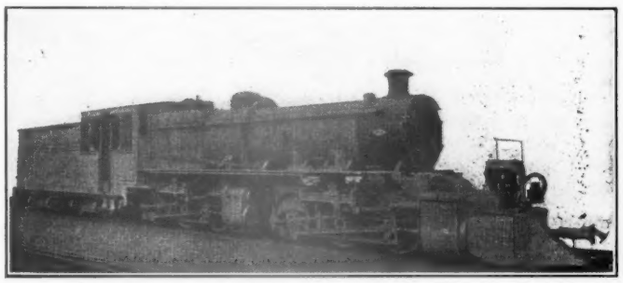
Electrification and New Equipment in Hungary

The Hungarian State railways are reported to have placed orders with a consortium of Hungarian car manufacturers for 2,000 cars, practically all for freight service, according to Commerce Reports. The state railway shops were given an order for 50 locomotives, while an order for 100 more is under consideration. The installation of a double track on the Budapest-Szabadka line is to be continued, and other lines will be double-tracked as soon as possible.

Present conditions seem to indicate the probability of electrification of some of the Hungarian railways. Although the government has not arrived at any decision regarding this matter, it is proposed ultimately to electrify all trunk lines radiating from Budapest—a total of about 1,400 kilometers, or 2,000 kilometers including double tracks. No decision has been reached as to the system of electrification, though a new split-phase system, somewhat similar to that of the Norfolk & Western Elkhorn grade, will be given a trial. An experimental run will be started about the end of April on a short line of about 15 kilometers, equipped with overhead construction. If the test proves satisfactory, a definite decision will be arrived at next year, and general electrification will be pushed as rapidly as financial and manufacturing conditions will permit.

Meter Gage Mallets for Burma

The accompanying photograph depicts a locomotive recently built by the North British Locomotive Company, Ltd., Glasgow, Scotland, for the Burma Railways (meter gage). This locomotive is a Mallet articulated compound and develops 22,170 lb. tractive effort at 50 per cent of its working pressure, which is 180 lb. The wheels are 3 ft. 3 in. in diameter. High pressure cylinders are 15½ in. in diameter and low pressure cylinders 24¼ in. Saturated steam is used and is generated by a grate area of 33 sq. ft. The engine weighs 133,000 lb. and is equipped with a Pyle National electric headlight. These locomotives are the sixth lot of North British locomotives delivered to India and Burma. They were built in accordance with the instructions of Messrs. Rendel, Palmer and Tritton, consulting engineers for the Burma Railways. The photograph and the data presented here were taken from Modern Transport (London).



Mallet With Tractive Effort of 22,170 Pounds

Americans Finance Railway in Australia

The government of the State of Queensland, Australia, has recently negotiated a loan from American bankers for the purpose of constructing a railroad to develop lands on the Upper Burnett, Callide Valley, upon which it is intended to locate settlers upon very favorable terms, according to Commerce Reports. The Bureau of Foreign and Domestic Commerce is endeavoring to arrange to have American manufacturers given an opportunity to bid upon the rails, equipment, construction machinery, and other materials needed for the project. The specifications have not yet been completed, but information on this subject can be obtained, as soon as it is received from Australia, from the Iron and Steel Division of the Bureau at Washington.

Equipment and Supplies

Locomotives

THE PEORIA & EASTERN is inquiring for repairs on 17 locomotives.

THE BOSTON & MAINE may ask for about 20 locomotives in the near future.

PHELPS, DODGE & CO. has ordered two locomotives from the H. K. Porter Company.

THE MIDLAND VALLEY has ordered 3 Mikado type locomotives from the Baldwin Locomotive Works.

THE MOBILE & OHIO is inquiring for 10 Mikado type locomotives. These locomotives will have 26 by 30 in. cylinders.

THE PHILADELPHIA & READING has ordered 25 Consolidation type locomotives from the Baldwin Locomotive Works.

THE CARNEGIE STEEL COMPANY has ordered from the American Locomotive Company one locomotive for its Youngstown plant.

LEONARD KENNEDY & CO., 67 Wall street, New York City, has ordered 4, 0-6-0 type locomotives from the Baldwin Locomotive Works. These locomotives are for export to Brazil.

THE LEHIGH & NEW ENGLAND, reported in the *Railway Age* of March 4 as inquiring for locomotives, has ordered 4 Consolidation type locomotives from the American Locomotive Company.

THE LEHIGH VALLEY is having repairs made and superheaters installed on 14 ten-wheel locomotives at the Dunkirk shops of the American Locomotive Company. This is the beginning of a well defined program for modernizing the small motive power on this road.

Freight Cars

THE NEWPORT NEWS SHIPBUILDING & DRY DOCK CO., is inquiring for 1 flat car of 120 tons capacity.

THE CHICAGO & NORTH WESTERN, noted in the *Railway Age* of March 11 and 25 as inquiring for 3,100 freight cars has opened bids for this equipment. It is expected that contracts will be awarded by the end of this week.

THE NORTHERN PACIFIC, reported in the *Railway Age* of February 11 as inquiring for 500 refrigerator cars has ordered 1,000 refrigerator cars from the American Car & Foundry Co. The Company is now inquiring for 60 express refrigerator cars.

THE CHICAGO, MILWAUKEE & ST. PAUL, noted in the *Railway Age* of February 11 as inquiring for 1,000 or more 40-ton box cars, has ordered 4,000 cars distributed 1,000 each to the Pullman Company and the Western Steel Car & Foundry Company; 1,500 to the Bettendorf Company; and 500 to the General American Car Company.

THE NEW YORK CENTRAL is negotiating with car builders to place contracts for freight cars, reported to be about 16,000. The orders are expected to be divided about as follows: To the American Car & Foundry Company, 5,500; Standard Steel Car Company, 5,500; Ralston Steel Car Company, 500, and divided between the Pressed Steel Car Company and the Pullman Company, 4,500 cars.

Passenger Cars

THE BOSTON ELEVATED is inquiring for 100 cars.

THE WESTERN PACIFIC is inquiring for 5 dining cars.

THE WABASH is inquiring for 8 coaches, 9 chair cars, 2 buffet chair cars, 2 cafe chair cars and 4 dining cars.

THE SOUTHERN PACIFIC has ordered 50 steel cars for service on its Pacific Electric division from the St. Louis Car Company, the electrical equipment to be furnished by the Westinghouse Electric & Manufacturing Company.

Iron and Steel

THE BOSTON ELEVATED has ordered 600 tons of structural steel for a shed from the McClintic-Marshall Company.

THE SEABOARD AIR LINE is inquiring for 300 tons of structural steel for a bridge over the Altamaha river in Alabama.

THE LOUISVILLE, HENDERSON & ST. LOUIS has ordered 3,000 tons of rails from the United States Steel Corporation.

THE SOUTH MANCHURIAN RAILWAY is inquiring through export houses in New York City for 8,000 tons of rail.

THE DELAWARE, LACKAWANNA & WESTERN has ordered from the American Bridge Company 1,800 tons of structural steel for bridge repairs at various places on the road.

THE CHICAGO, ROCK ISLAND & PACIFIC has awarded a contract to the Fort Pitt Bridge Company, Pittsburgh, Pa., for 1,662 tons of steel to be used in a bridge over Sylvan Slough, Rock Island, Ill.

THE LEHIGH & NEW ENGLAND has ordered about 500 tons of steel from the Bethlehem Steel Bridge Corporation for new bridges and about 300 tons of tie plates from the Bethlehem Steel Company.

THE GREAT NORTHERN has awarded a contract to the American Bridge Company, Chicago, for 997 tons of steel to be used for repairs to a bridge at St. Cloud, Minn., and for spans in connection with grade separation work at Minneapolis, Minn.

THE LEHIGH VALLEY is inquiring for 700 tons of structural steel for a number of bridges. A contract was given recently by this company to the Bethlehem Steel Company for 1,600 tons of structural steel for use at its Claremont, N. J., terminal.

THE PHILADELPHIA & READING has ordered from the Bethlehem Steel Company 10,000 tons of 100-pound rails and 3,000 tons of 130-pound rails; also from the Carnegie Steel Company 5,000 tons of 130-pound rails, and from the Midvale Steel Company 2,000 tons of 130-pound rails. All the rails are for delivery during the latter half of this year.

Machinery and Tools

THE SEWELL VALLEY has given orders for the following machinery: To the Niles-Bement-Pond Company, a 20-ton electric traveling crane with 5-ton auxiliary, 56-ft. 3-in. span, and a 36 in. by 36 in. by 10 ft., and three head motor driven Pond planers; to the Motch & Merryweather Company, Pittsburgh, Pa., a No. 4 plain Cincinnati milling machine, motor driven; to Manning, Maxwell & Moore, Inc., Philadelphia, Pa., a 400-ton Chambersburg wheel press, motor driven; and to Wilmarth & Norman, a No. O cutter, reamer and drill grinder, motor driven. The company also expects to place an order shortly for additional machinery.

Miscellaneous

THE ILLINOIS CENTRAL is inquiring for 2,000 tons of tie plates.

THE NORTHERN PACIFIC is inquiring for 5,000 tons of tie plates, and also contemplates purchasing spikes and bolts.

THE DEPARTMENT OF DOCKS, New York city, expects to come in the market soon for a large amount of equipment for the Staten Island docks at St. George. The inquiry will include railroad tracks, frogs and switches.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS is inquiring for its requirements of 32-34 gravity fuel oil in tank cars, for the period from April 1, 1922, to June 1, bids on which are to be in before 12 o'clock noon April 3.

Supply Trade News

William Ochse, for the past two years sales representative of Manning, Maxwell & Moore, Inc., at Chicago, has been appointed efficiency engineer of the Ohio Machine Tool Company, Kenton, Ohio.

E. H. Walker has resigned as president of the Standard Coupler Company, New York, effective March 15. Mr. Walker will enter business for himself, an announcement of which will be made later.

Joseph B. Turbell, president of the **American Brake Shoe & Foundry Co.,** New York, has been elected also chairman of the board and **James S. Thompson,** vice-president, has been elected also a director to succeed Otis H. Cutler, deceased.

The Reed Railway Supply Company has leased for general headquarters a four-story building at 113 N. Second street, St. Louis, Mo. **Joseph Reed,** formerly president of the Southern Hardware & Supply Company, is president of the company.

Fred Mathews, formerly vice-president of the Union Metal Products Company, has been appointed general railway sales representative of the **A. O. Smith Corporation,** Milwaukee, Wis. Mr. Mathew's office is at 1306 Consumers building, Chicago, Ill.

W. F. Hayes has been appointed general time inspector of the **Official Bureau of Railroad Time Service,** to succeed **Webb C. Ball,** deceased. Since Mr. Ball's death, the service has been organized with **H. J. Cowell,** in charge of the Cleveland office as assistant to Mr. Hayes, **Laurence L. Doty** at the Chicago office, **O. H. Pyper** at the Winnipeg office, **S. A. Pope** at San Francisco and **V. A. Corrigan** at the Houston office. Mr. Hayes was born on a farm near Palmyra, Wis. He served his apprenticeship as a watchmaker, at which trade he remained for 15 years. For several years he was in the jewelry business in Janesville, Wis., where he was local watch inspector for the Chicago & North Western and the Chicago, Milwaukee & St. Paul. In 1903 he became associated with Mr. Ball, having jurisdiction over the Chicago, San Francisco, Houston and Winnipeg offices.

W. F. Hayes

Fred Mathews, formerly vice-president of the Union Metal Products Company, Chicago, has been appointed general railway sales representative of the A. O. Smith Corporation of Milwaukee, Wis. Mr. Smith's offices are at 1306 Consumers Building, Chicago.

Edward B. Craft, assistant chief engineer of the **Western Electric Company** has been appointed chief engineer with headquarters at New York; **Dr. F. B. Jewett,** vice-president of the company at New York, who preceded Mr. Craft as chief engineer, is now in charge of the telephone department, which includes the engineering department, the telephone sales department and the manufacturing department.

The Black & Decker Manufacturing Company, Baltimore, Md., has removed its Cleveland, Ohio, office from 6225 Carnegie avenue to 2030 East Twenty-second street. This office is in charge of **Dan Paul,** formerly manager of the company's Pittsburgh, Pa., office. **W. C. Allen,** former manager of the Philadelphia branch, and subsequently special representative, has been made branch manager of the Chicago territory; Mr. Allen was formerly connected with the Manley Manufacturing Company, as assistant sales manager and has been associated with the Black & Decker Manufacturing Co. for about three years.

A. S. Duncan, storekeeper at the East Pittsburgh works of the **Westinghouse Electric & Manufacturing Company,** East Pittsburgh, Pa., has been appointed general storekeeper of finished stocks. **H. L. Jones,** assistant superintendent, has been appointed superintendent of the switchboard and detail department; **A. J. Bastian,** assistant superintendent, has been appointed superintendent of the insulating department; **W. H. Miller** has been appointed supervisor of tools and gages and **W. F. Ablauf** has been appointed supervisor of mica and mica processes in the inspection and testing department—all with headquarters at East Pittsburgh.

Air Reduction Sales Company Acquires Davis-Bournonville Company

The Air Reduction Sales Company, New York, on March 17, acquired all the assets, including the patents, trade marks and trade names, of the Davis-Bournonville Company of Jersey City, N. J. The consolidation brings together two large companies, whose histories have, to a great extent, been the history of the development of the oxyacetylene welding and cutting industry.

The Air Reduction Sales Company is a pioneer in the extraction of gases from the air for industrial use. Its principal product is oxygen, which is used to the greatest extent, in conjunction with acetylene, in producing the high-temperature oxyacetylene flame. The Air Reduction Company further produces nitrogen and argon for incandescent lamp manufacture, and neon for electrical devices, of which the new and highly useful Airco ignition gage is an example. Acetylene ranks second to oxygen in importance in the list of Airco products.

The Davis-Bournonville Company was organized in 1907 by Augustine Davis, Eugene Bournonville and C. B. Wortham and at once took up the manufacture of oxyacetylene torches. As success was attained in connection with the welding torch, the company's activities were directed to the development of oxyacetylene cutting torches, acetylene generators, and finally to machines for welding and cutting. It is the intention of the Air Reduction Sales Company to continue the manufacture of D-B torches, acetylene generators, special machines, etc., under the supervision of the men who developed them. The equipment will be marketed under the trade name of Airco-Davis-Bournonville.

American Steel Foundries

The American Steel Foundries reports earnings from operations for the year ending December 31, 1921, of $1,428,188, as compared with $6,915,734 in the previous year. After deducting depreciation and fixed charges and adding non-operating income, the net profits were $675,009, as against $4,496,442 in 1920. During the year $5,150,000 of notes were paid, inventories were reduced one-third and accounts payable were cut in half. Current liabilities were reduced from approximately $11,000,000 to $3,700,000. Working capital was $13,125,542 at the close of the year and current assets were more than 4 to 1 in relation to current liabilities.

The balance sheet, December 31, 1921, shows the following:

Assets	
Real estate equipment, etc., less depreciation reserve	$33,276,843
Preferred stock sinking fund (in bank)	85,593
Current assets	16,888,503
Deferred charges to operations	123,809
	$50,374,748
Liabilities	
Capital stock	$28,782,300
Capital stock of subsidiary company	4,733,336
Four per cent debentures	340,800
Current liabilities	3,762,961
Sundry operating reserves	470,174
Appropriated surplus	3,314,144
Unappropriated surplus	8,971,033
	$50,374,748

Bethlehem Steel Corporation

The annual report of the Bethlehem Steel Corporation for the year ended December 31, 1921, shows net incomes after charges of $10,332,804, as compared with $14,458,836 for 1920. The value of current assets as of December 31, 1921, was $87,748,433 in excess of current liabilities, compared with $77,473,917 excess at the end of 1920. Of the total current assets $54,881,227 consisted of cash and marketable securities, largely obligations of the United States Treasury. The balance sheet showed further that inventories at the close of last year had been reduced to $39,240,537, as compared with $73,208,678 as of December 31, 1920. The unappropriated surplus at the close of 1921 was $12,418,929.

The comparative income account for the years ended December 31, 1921 and 1920, is as follows:

	1921	1920
Gross sales and earnings	$147,794,353	$274,431,236
Less—Manufacturing cost, administrative, selling and general expense, and taxes	125,943,819	239,468,865
Net manufacturing profit	$21,850,533	$34,962,372
Interest, dividends and other miscellaneous income	3,904,144	1,389,182
Total net earnings	$25,754,678	$36,351,554
Less—Interest charges, including proportion of discount on and expense of bond and note issues.	9,419,158	7,951,203
Balance	$16,335,519	$28,400,350
Provision for depreciation, obsolescence and depletion	6,002,715	13,941,515
Net income for the year	$10,332,804	$14,458,835

The Westinghouse Air Brake Company

The financial results of the Westinghouse Air Brake Company for the year ended December 31, 1921, shows net earnings of $1,412,490. This compares with $6,580.404 in the previous year. The balance, surplus, December 31, 1921, was $12,931,103 as compared with $16,140,580 at the close of 1920.

H. H. Westinghouse, chairman of the board, in his report to the stockholders, said:

"As outlined in our last annual report to the stockholders, we entered the year 1921 with a fair volume of unfilled orders on hand and as a consequence our shipments for the first quarter were fairly satisfactory; but on account of the general business depression and particularly the curtailing of purchases by the railroads of the country, our orders received during the year under review amounted to less than 50 per cent of normal, which resulted in plant operations and shipments for the year of approximately this same percentage. Under existing conditions it would be difficult and useless to endeavor to forecast the future. With a return, however, of better general conditions and railroad buying resumed, your company's business should rapidly return to normal."

The consolidated balance sheet for 1921 follows:

Assets		
Cash		$3,109,607
Accounts and bills receivable		5,068,744
Liberty bonds and other U. S. obligations		1,784,188
Inventories		10,802,329
Investments		8,946,623
Factories		10,666,758
Real estate, other than for factories		2,152,153
Patents and good will		4,941,954
Deferred charges to operation		176,547
		$47,648,902
Liabilities		
Bills payable		$ 800,000
Accounts payable		1,112,491
Taxes, etc., accrued, not yet due		118,202
Reserve for federal taxes prior to 1921		629,400
Capital stock, at par, of subsidiary companies not held by the Westinghouse Air Brake Company		19,608
Sundry reserves (including amounts held against patent and goodwill account)		2,893,897
Capital stock, issued	$29,165,800	
Less held in treasury	21,600	
		29,144,200
Surplus		12,931,103
		$47,648,902

Obituary

Harvey E. Grace, vice-president and treasurer of the William Grace Company, Chicago, railroad contractors, died suddenly on March 24, at his home in that city.

Railway Construction

ALASKA ENGINEERING COMMISSION.—This commission will receive bids until May 1, for the construction of a single track structural steel bridge on the Alaska Railroad.

ATCHISON, TOPEKA & SANTA FE.—This company, which was noted in the *Railway Age* of March 18 (page 762), as receiving bids for the construction of two one-story brick lavatory buildings at Chicago, has awarded the contract for this work to Jerome Moss, of that city.

CENTRAL OF NEW JERSEY.—This company is contemplating some heavy grade crossing elimination at Perth Amboy, N. J., in conjunction with the Lehigh Valley and the Pennsylvania Railroad. A total of five highway or street grade crossings and one railroad crossing will be eliminated of which four of the street crossings will be done by the Jersey Central, and one by the Lehigh, the railroad crossing being a joint proposition.

CHATTANOOGA-CROSSVILLE PROJECT.—A survey is now being made for the construction of a railroad to extend from Chattanooga, Tenn., to Crossville, a distance of about 35 miles, at which latter point a connection will be made with the Tennessee Central. It is expected that the construction of this line will be completed by the end of the coming summer and that the road will traverse through the largest undeveloped coal fields in that state. C. E. James of Chattanooga is in charge of the project.

CHICAGO, BURLINGTON & QUINCY.—The statement which appeared in the *Railway Age* of March 25, page 803, to the effect that this company had awarded a contract to John Griffith and Sons for the construction of a four-story inbound freight house in Chicago was incorrect. Bids are still being received for this work.

GREAT NORTHERN.—This company, which was noted in the *Railway Age* of March 25 (page 803), as about to receive bids for the construction of terminal facilities at Wenatche, Wash., has let a contract to A. Guthrie & Co. for the grading and work has already been started in the preparation of the ground for the buildings. The total expenditure for this project will aggregate approximately $1,500,000.

GREAT NORTHERN.—This company, noted in the *Railway Age* of March 18, as having closed bids on March 15 for the construction of a 30-stall roundhouse, shop buildings, storehouses and other terminal facilities at Minneapolis Junction, Minn., has awarded a contract for this work to A. Guthrie & Co., St. Paul.

LOUISVILLE, HENDERSON & ST. LOUIS.—This company has awarded a contract for the construction of a 100-ton reinforced concrete coaling and sanding plant at Owensboro, Ky., to the Howlett Construction Company, Moline, Ill.

MISSOURI PACIFIC.—This company will receive bids until April 8, for the replacing of 10 wooden trestles near Aurora, Mo., with concrete structures and earth embankments.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—This company contemplates the reconstruction of its three-story brick office building at Nashville, Tenn., which was recently destroyed by fire. No definite plans have been made as yet.

NEW YORK & LONG BRANCH.—This company has awarded a contract to Charles Ward Hall, Inc., New York City, for the construction of a new brick and limestone passenger station, covered platforms and roadways, etc., at Asbury, N. J. Estimated cost is $125,000.

WICHITA FALLS & OKLAHOMA.—This company has applied to the Interstate Commerce Commission for authority to construct a new line from the present terminus at the Texas-Oklahoma state line northeast to Waurika, Okla., 7½ miles, and a line from Byers, Texas, to the Oklahoma state line, 5.8 miles.

Railway Financial News

ANN ARBOR.—*Merger Plans Denied.*—See Pere Marquette.

ASHERTON & GULF.—*Application to Issue Bonds Denied.*—The Interstate Commerce Commission has denied this company's application for authority to issue $436,000 of first mortgage bonds on the ground that a satisfactory showing of its ability to earn the interest has not been made.

BOSTON & MAINE.—*Granted Loan from Revolving Fund.*—The Interstate Commerce Commission has certified a loan of $5,000,000 to this company to enable it to meet a previous loan from the revolving fund maturing June 1.

CANADIAN PACIFIC.—*Annual Report.*—This company's annual report for 1921 is reviewed in an article on another page of this issue entitled "C. P. R. Soon to Own Fleet Totaling 438,604 Tons." See also excerpts from annual report on adjacent pages.

CENTRAL OF GEORGIA.—*Equipment Trust Certificates Authorized.*—This company has been authorized by the Interstate Commerce Commission to assume obligation or liability in respect of $660,000 of equipment trust certificates.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—*Annual Report.*—The annual report issued this week shows a condensed income statement for the years ended December 31, 1921 and 1920 as follows:

	1921	1920
Gross operating revenues	$15,162,870	$13,611,131
Total operating expenses	12,181,950	13,210,542
Net operating revenues	2,980,920	400,588
Taxes, etc.	738,000	492,431
Net operating income	2,242,919	Def. 91,842
Other income	249,905	133,907
Standard return	.....	270,000
Guaranty U. S. government	459,751	815,249
Total other income	$709,656	$1,219,156
Total gross income	2,952,576	1,127,313
Deductions from total gross income for fixed charges including interest on funded debt	2,229,012	2,261,207
Balance of income over charges, carried to credit of profit and loss	723,564	.....
Balance of deficit carried to debit of profit and loss	.....	1,133,893
Dividends declared	370,225	370,223
Surplus (credit)	$353,339	.....
(debit)	.....	$1,504,117

CHICAGO, PEORIA & ST. LOUIS.—*Receivers' Certificates Authorized.*—The receivers have been authorized by the Interstate Commerce Commission to issue $335,000 of receivers' certificates to be sold at not less than par and the proceeds used to pay indebtedness incurred in the operation of the property.

DELAWARE & HUDSON.—*Bonds Offered.*—Kuhn, Loeb & Co. and the First National Bank are offering at 98 and interest to yield 5.70 per cent of $7,500,000 15-year 5½ per cent bonds, due May 1, 1937. The bonds, which are sold subject to approval of the Interstate Commerce Commission, are not redeemable for the first ten years. Thereafter they will be redeemable as a whole on May 1, 1932, at 105 and interest, or any subsequent interest date at 105, less ½ per cent for each six months from May 1, 1932, to redemption date upon sixty days' notice.

DELAWARE, LACKAWANNA & WESTERN.—*Financing Plan of Lessor Company.*—See New York, Lackawanna & Western.

DENVER & RIO GRANDE.—*Perkins Committee to Survey Property.*—The Perkins committee, headed by James Perkins, president of the Farmers Loan & Trust Company, has arranged with Coverdale & Colpitts, consulting engineers, for a survey and report on the property of this railroad. This committee represents Denver & Rio Grande refunding 5s and is opposed to the Western Pacific's plan of reorganization. It is expected that the work will take two or three months. The Perkins committee adopted this action so that it could have an independent report of the Denver's condition. It may lead to the announcement of a new reorganization plan by this committee.

The Hammond committee, representing the refunding 5s in favor of the Western Pacific plan, has asked for the deposit of 80 per cent of the bonds in the hands of the public for the consummation of that plan. Neither this committee nor the Perkins committee is understood to have 25 per cent of the $31,616,000 outstanding bonds. With a deposit of 50 per cent either group thinks that it will be able to control the situation.

ERIE.—*Authorized to Issue Notes.*—This company has been authorized by the Interstate Commerce Commission to issue $10,000,000 of demand promissory notes for one year at 6 per cent and $2,500,000 of 6 per cent demand notes to be delivered to the War Finance Corporation upon the cancellation of a like face amount of three-year 6 per cent gold notes maturing on April 1.

ERIE.—*Bonds Offered.*—White, Wells & Co., Cassatt & Co., and West & Co. are offering $5,000,000 consolidated mortgage 7 per cent gold bonds of the Erie, due September 1, 1930, at 103¾, to yield more than 6.40 per cent.

GOLDEN BELT.—*Application for Certificate of Public Convenience Denied.*—The Interstate Commerce Commission, after a rehearing, has affirmed the conclusion reached in a former report that this company's application for a certificate authorizing the construction of a line from Great Bend to Hays, Kans., should be denied. The commission says the line would prove a convenience to a considerable number of people, but that fact alone cannot be relied upon to justify the addition to the transportation resources of the country of an enterprise which gives no promise of being self-sustaining.

ILLINOIS CENTRAL.—*Equipment Trusts Sold.*—The Commercial & Financial Chronicle states that the Kuhn, Loeb & Co. have sold privately $3,255,000 5½ per cent equipment trust certificates, series "H."

MANISTIQUE & LAKE SUPERIOR.—*Authorized to Abandon Branch Line.*—The Interstate Commerce Commission has issued a certificate authorizing the abandonment of the McNeil branch in Schoolcraft County, Mich., 7½ miles.

MIDLAND.—*Application for Loan Denied.*—The Interstate Commerce Commission has denied this company's application for a loan of $200,000.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—*Asks Authority to Sell Bonds.*—This company has applied to the Interstate Commerce Commission for authority to sell $2,500,000 of first refunding mortgage 6 per cent bonds now held in the treasury, the issue of which was previously authorized by the commission. It is proposed to sell the bonds to Dillon, Read & Co., at 101½.

MISSOURI PACIFIC.—*Asks Authority to Sell Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue $18,096,500 of first and refunding mortgage 6 per cent gold bonds. The application is dated March 24, which was the date an advertisement appeared stating that the bonds had been sold. Of the total, $13,641,000 is to discharge or refund first and refunding mortgage 5 per cent bonds and $4,455,500 is to reimburse the treasury for expenditures.

NEW YORK CENTRAL.—*Proposed Acquisitions.*—This company's application for authority to purchase the stock of the Chicago River & Indiana and to lease the Chicago Junction with an option to purchase its stock has been assigned for oral argument before the full membership of the Interstate Commerce Commission at Washington on April 5.

NEW YORK, LACKAWANNA & WESTERN.—*Financing Plan.*—A special meeting of the stockholders will be held on April 25 to ratify a proposed increase in capital stock from $10,000,000 to $15,000,000 and a bond issue of $30,000,000. If authorized, these issues will be used to pay or refund $22,000,000 outstanding bonds, a $1,640,000 note held by the Delaware, Lackawanna & Western; and for future capital expenditures.

The New York, Lackawanna & Western has $12,000,000 first 6s which were taken up by the Delaware, Lackawanna & Western on maturity, January 1, 1921, and $10,000,000 construction and improvement bonds, of which $5,000,000 are due in May, 1923, and $5,000,000 in August, 1923. These are guaranteed by the Delaware, Lackawanna & Western, which owns about $2,000,000 of them. According to the plan, the Delaware, Lackawanna & Western is to be reimbursed for advances by means of the new issues.

NEW YORK, LACKAWANNA & WESTERN.—*Financing Plan.*—A special meeting of the stockholders will be held April 25 to ratify a proposed increase in capital stock from $10,000,000 to $15,000,000 and a bond issue of $30,000,000. These issues if authorized will be used for payment or refunding of $22,000,000 outstanding bonds and a $1,640,000 note held by Delaware, Lackawanna & Western; also for future capital expenditures.

The company has $12,000,000 first 6s, which were taken up by the Delaware, Lackawanna & Western on maturity January 1, 1921, and $10,000,000 construction and improvement bonds due 1923, guaranteed by D., L. & W., of which the latter owns about $2,000,000.

Plan is to reimburse D., L. & W. for advances by means of the new issues, but whether this will involve any public offering company officials have not yet determined.

NEW YORK, NEW HAVEN & HARTFORD.—*Authorized to Issue Bonds.*—This company has been authorized by the Interstate Commerce Commission to issue $2,758,000 of the first and refunding mortgage bonds to be pledged with the Secretary of the Treasury as partial security for a loan. The commission has also authorized the sale of $1,796,000 of equipment trust notes, the proceeds to be used toward payment of certain promissory notes.

Stockholders' Meeting.—The stockholders at their meeting in New Haven, Conn., on April 19 will pass on the acceptance of an extension of time for the European loan from April 1, 1922, to April 1, 1925. Besides considering proposed new bond issues there will also be the question of acceptance of the equipment agreement with the federal Railroad Administration as amended under date of January 22, 1922; the approval of a lease to the New York, Westchester & Boston Railway of that portion of this company's right of way between Mount Vernon, N. Y., and Larchmont, N. Y., on which the railway company's tracks are now constructed and operated.

NORFOLK & WESTERN.—*Annual Report.*—The corporate income account for the year ended December 31, 1921, compares as follows:

	1921	*1920
Operating revenues:		
Freight	$67,221.436	
Passenger	10,077,720	
Total, including other	$80,718,802	
Operating expenses:		
Maintenance of way and structures	$11,783,699	
Maintenance of equipment	19,841,345	
Traffic	843,161	
Transportation	29,849,426	
General	1,842,026	
Total operating expenses	$64,346,857	
Net revenue from railway operations	16,371,945	
Railway tax accruals	4,730,000	
Railway operating income	11,613,964	
Net railway operating income	14,479,836	$17,055,345†
Total non-operating income	1,107,507	881,395
Gross income	15,587,343	17,936,740
Total deductions	5,544,162	5,439,951
Net income	10,043,181	12,496,788
Dividends on adjustment preferred stock	919,692	919,692
Income balance	9,123,489	11,577,096

*Operation during 1920 having been for two months under federal control for six months under the government's guaranty, and for four months without government relationship, no comparisons of items of railway operating income and expenses are shown in this statement.

†Balance federal control period—Jan. 1 to Feb. 29, 1920	$3,411.787
Estimated balance guaranty period—March 1. to Aug. 31, 1920	10,405,436
Railway company's operations—Sept. 1, to Dec. 31, 1920	3,238,122
	$17,055,345

Dividends on the common stock in 1921 totaled 7 per cent amounting to $8,506,190.

To Pay Notes.—The Norfolk & Western has called for payment at 101, on May 1, 1922, its entire issue of $2,500,000 four year 6 per cent notes, due May 1, 1924.

NORTHERN RAILWAY (FRANCE).—*Bonds Sold in London.*—An issue of Nord Railway £5,000,000 6 per cent bonds were sold in London, England, on March 23, at 90, according to a cable to the New York Journal of Commerce.

NORTHEASTERN OKLAHOMA.—*Application for Loan Denied.*—This company's application for a loan of $500,000 has been denied by the Interstate Commerce Commission.

PECOS VALLEY SOUTHERN.—*Application for Loan Denied.*—The Interstate Commerce Commission has denied this company's application for a loan of $150,000.

PERE MARQUETTE.—*Merger with Ann Arbor Denied.*—E. N. Brown, chairman of the board, has flatly denied any negotiations between this company and owners of the Ann Arbor to acquire the latter. Mr. Brown said his auditors went over the books of the Ann Arbor a few months ago in response to a request from Ann Arbor interests who were seeking to interest Pere Marquette in the matter. He said undoubtedly this was what caused the rumor of possible negotiations to be circulated. On the report of the auditors the Pere Marquette board decided that it would not be warranted in considering acquisition of the Ann Arbor.

SALINA NORTHERN.—*Application for Loan Denied.*—The Interstate Commerce Commission has denied the application of the receivers for a loan of $308,630.

SHEARWOOD.—*Application for Loan Denied.*—The Interstate Commerce Commission has denied this company's application for a loan of $9,500.

TENNESSEE RAILROAD.—*Application for Loan Denied.*—The Interstate Commerce Commission has denied this company's application for a loan of $100,000 for additions and betterments.

WABASH.—*Equipment Trusts Sold.*—Speyer & Co. and the Equitable Trust Company have sold $6,546,800 equipment trust 6 per cent gold notes at prices to yield 5.40 to 5.75 per cent according to maturity.

WYOMING.—*Application for Loan Denied.*—The Interstate Commerce Commission has denied this company's application for a loan of $100,000.

Tentative Valuations

The Interstate Commerce Commission has issued a number of additional tentative valuation reports in which it finds the final value to be as follows:

		Property owned	Property used
Columbia Union Station Company	1919	$162,331	$175,671
Duluth & Superior Bridge	1916	640,000	
Linville River	1916	249,662	249,709
Louisiana Railway & Navigation Co.	1917	10,856,479	10,796,479
Northern Alabama	1916	3,189,429	
Raritan River	1916	1,215,416	1,216,646
Wildwood & Delaware Bay	1916	190,000	190,704

Railroad Administration Settlements

The United States Railroad Administration reports the following final settlements, and has paid out to the several roads the following amounts:

Louisville, Henderson & St. Louis	$660,000
Toledo Terminal	100,000
Erie and Lehigh Valley, as Joint Lessees of the Railroad of the Buffalo Creek Railroad Company	185,000

The payment of these claims on final settlement is largely made up of balance of compensation due, but includes all other disputed items as between the Railroad Administration and the railroad companies during the 26 months of federal control.

Dividends Declared

Northern Pacific—1¼ per cent, quarterly, payable May 1 to holders of record April 12.

Northern Railroad of New Hampshire—1½ per cent, quarterly, payable April 1 to holders of record March 13.

Old Colony—1¾ per cent, quarterly, payable April 1 to holders of record March 11.

Trend of Railway Stock and Bond Prices

	March 28	Last Week	Last Year
Average price of 20 representative railway stocks, close of business	60.60	61.18	53.69
Average price of 20 representative railway bonds, close of business	83.19	83.41	73.89

THE ARMS-YAGER RAILWAY CAR COMPANY has succeeded the Arms Palace Horse Car Company, the change of name having been announced by W. A. Yager, president, on March 1. For this company's cars the American Railway Association has assigned new reporting marks—"A. Y. R. X.", and the cars will be relettered as early as practicable.

Annual Report

Canadian Pacific Railway Company—Forty-First Annual Report

To the Shareholders:

The accounts of the Company for the year ended December 31st, 1921, show the following results:—

Gross Earnings		$193,021,854.40
Working Expenses (including all taxes)		158,820,114.09
Net Earnings		$34,201,740.31
Deduct Fixed Charges		11,519,071.97
Surplus		$22,682,668.34
Contribution to Pension Fund		500,000.00
		$22,182,668.34
From this there has been charged a half-yearly dividend on Preference Stock of 2 per cent., paid October 1st, 1921	$1,613,638.42	
And three quarterly dividends on Ordinary Stock of 1¾ per cent. each, paid June 30th, 1921, October 1st, 1921, and December 31st, 1921	13,650,000.00	
		15,263,638.42
		$6,919,029.92
From this there has been declared a second half-yearly dividend on Preference Stock of 2 per cent. payable April 1st, 1922	$1,613,638.42	
And a fourth quarterly dividend on Ordinary Stock of 1¾ per cent., payable April 1st, 1922	4,550,000.00	
		6,163,638.42
Leaving net surplus for the year		$755,391.50

In addition to the above dividends on Ordinary Stock, three per cent. was paid from Special Income.

SPECIAL INCOME FOR YEAR ENDED DECEMBER 31st, 1921.

Balance at December 31st, 1920	$20,530,292.08	
Less: Dividend paid April 1st, 1921	1,950,000.00	
		$18,580,292.08
Net Revenues from Investments and Available Resources, Exhibit "C"		2,307,332.06
Interest on Deposits, and Interest and Dividends on Other Securities less Exchange		1,840,866.51
Net Earnings Ocean and Coastal Steamship Lines		2,785,614.93
Net Earnings Commercial Telegraph and News Department, Hotels, Rentals and Miscellaneous		4,053,385.62
		$29,567,491.20
Less: Payments to Shareholders in dividends: June 30th, 1921, October 1st, 1921, and December 31st, 1921		5,850,000.00
		$23,717,491.20
From this a dividend has been declared payable April 1st, 1922		$1,950,000.00

2. The working expenses for the year, including all taxes, amounted to 82.28 per cent. of the gross earnings, and the net earnings to 17.72 per cent., as compared with 84.70 per cent. and 15.30 per cent. respectively in 1920.

3. The gross earnings of your transportation system during the fiscal year under review were less than those of 1920 by $23,619,494, but the net earnings increased by $1,048,695. The large decrease in the gross earnings is attributed to the general business depression which set in at the end of 1920 and continued practically without interruption during the fiscal year under review, to the decrease in passenger fares in January and July and in freight rates in December, and to partial crop failure in some portions of Western Canada in areas served by your lines of railway. Of the expenses of the year, 53.84 per cent. was disbursed on account of labor, 25.92 per cent. for material and miscellaneous supplies, 15.51 per cent. for fuel and other locomotive supplies and 3.49 per cent. for taxes. The balance, 1.24 per cent., was necessary to meet Loss and Damage claims. By the exercise of the strictest economy and the deferring of work which could be postponed, especially during the early part of the year when traffic was particularly light, and by the savings effected through the reduction in wages secured in September, your Officers were able to reduce expenses to an amount in excess of the decrease in gross revenues due to the conditions already mentioned. In the circumstances, the year's operations must be regarded as satisfactory, particularly having regard to the decrease in passenger and freight rates mentioned above. The operating ratio compares most favorably with that of other Systems.

4. The sales of agricultural land in the year were 153,304 acres for $2,872,999, being an average of $18.74 per acre. Included in this area were 6,686 acres of irrigated land, which brought $53.13 per acre, so that the average price for the balance was $17.17 per acre. The sales of land in Western Canada were naturally very seriously affected by the economic conditions which prevailed during the year, resulting in a very large decrease in the acreage acquired by purchasers either from your Company or other land-owners. Your Directors are satisfied that with the adoption of reasonable immigration laws designed to encourage the entry into Canada of immigrants of the right type, you may look forward to a distinct improvement in the volume of land sales during the next few years.

5. During the year your Directors disposed in London of £4,800,000 (of which £4,504,428 was delivered prior to December 31st), and in New York of $25,000,000 of Four per cent. Consolidated Debenture Stock, the issuance and sale of which you had previously authorized, at prices which under the prevailing market conditions were extremely favorable, reflecting the high credit which the Company enjoys. The sales of this Stock in New York was effected in an eminently satisfactory manner, and though the Security was of a character practically unknown among American investors it received widespread and ready distribution. In order to meet the requirements of the United States market the certificates of the Debenture Stock there issued were made in bearer form with interest coupons attached, under conditions which permit of the conversion into registered Stock at the option of the holder, and you will be asked to give your sanction to By-law No. 47, Sub-section D, enacted by the Directors providing for the issue of certificates in this form.

The market for the Company's Consolidated Debenture Stock being so favorable both in the United States and in England, it was not considered desirable or necessary to create and issue bonds, debentures or other securities secured by pledge of Consolidated Debenture Stock, which you authorized at the special general meeting held on the fourth day of May of last year.

6. During the year your Directors consented to the issue of $2,671,000 Five per cent. Consolidated Bonds of the Minneapolis, St. Paul and Sault Ste. Marie Railway Company for the purpose of making payment for the property of the Wisconsin and Northern Railway Company, the purchase of which had been arranged by the Board of the former Company. They also consented to the issue and sale of $10,000,000 of the Minneapolis, St. Paul and Sault Ste. Marie 10-year Six and a half per cent. Notes to be secured collaterally by a portion of the $15,000,000 First Refunding Mortgage Six per cent. Bonds which that Company had power to issue. Both issues were made after the approval of the Interstate Commerce Commission was obtained.

In common with other American railroads the revenues of the Minneapolis, St. Paul and Sault Ste. Marie Railway Company and its subsidiaries fell off very materially during the past year and its operations were in particular seriously affected by the United States tariff against Canadian wheat and the practical shutting down of the iron ore mines in Michigan and Minnesota. Their revenues were also adversely affected through the depression in the lumber and livestock business. In these circumstances the Directors of that Company determined upon the reduction of the Preferred and Common Stock dividends to the basis of four per cent. per annum, and in their decision your Directors have concurred. A substantial improvement in traffic conditions on the railways of your United States subsidiaries is confidently looked forward to.

7. The four steamers under construction for the Atlantic and Pacific services will all be in commission for the present season. The S.S. "Montcalm" has already been delivered, and the "Montrose" and "Montclare" and "Empress of Canada" will be delivered in April and May. The S. S. "Princess Louise," constructed for the Pacific Coast Service, has been put into service and is in every respect satisfactory for the trade in which she is engaged During the year the Company purchased the steamships "Kaiserin Auguste Victoria," "Prinz Friedrich Wilhelm" and "Tirpitz" for extremely low prices. The "Kaiserin Auguste Victoria" has been renamed the "Empress of Scotland," the "Prinz Friedrich Wilhelm," the "Empress of India" and the "Tirpitz," the "Empress of Australia." The two first named will be added to the Atlantic fleet and the "Empress of Australia" will be added to the Pacific fleet. The cost of the ships under construction will exceed the original estimates by a considerable sum, due to protracted labor troubles, increased cost of materials and difficulties in the ship yards during the construction period. With the addition of the new ships constructed and purchased the total tonnage of your fleet will be 438,604 tons—the largest in the history of the Company, and the fleet, in numbers and in the character of ships in service, is in the opinion of your Directors amply able to maintain the high reputation of the Company on Atlantic, Pacific and coastal routes.

8. In anticipation of your confirmation your Directors authorized capital appropriations, in addition to those approved at the last annual meeting, aggregating for the year 1921, $1,743,444, and ask your approval to expenditures on capital account during the present year, as and when the conditions warrant such expenditures, of $10,622,137. Of this amount the principal items are:—

Replacement and enlargement of structures in permanent form	$1,021,700
Additional stations, round houses, freight sheds and shops, and extensions to existing buildings	1,008,200
Tie plates, rail anchors, ballasting, ditching and miscellaneous roadway betterments	243,200
Replacement of rail in main and branch line tracks with heavier section	1,500,700
Additional terminal and side track accommodation	431,500
New Pier "BC" at Vancouver	1,550,000
Extension work on Chateau Frontenac Hotel, Quebec	1,454,500
Additional lining, Connaught Tunnel	550,000
Mechanical Department, machinery at various points	439,000
Improvements to plant and machinery, Angus Shops	218,400
Improvements in connection with Telegraph service	291,400
Line Diversion at Port McNicoll	355,600
LaSalle Loop Line, South Bank Branch, Montreal	300,000
Line Diversion at Kingston Jct	100,000

The balance of the amount is required for miscellaneous works to improve facilities and effect economies over the whole system.

Your Directors feel that expenditures, for the first part of the year at all events, should be made with exceptional care in view of the existing traffic conditions and have therefore only authorized expenditures to the amount of $3,958,770, more than $3,000,000 of which is for the continuance of the work on the Chateau Frontenac and the new pier at Vancouver which has already been commenced.

9. At the request of the Government of Alberta your Directors have entered into an agreement for the construction and operation of an extension of the Central Canada Railway for twenty-five miles westerly from Peace River Landing to Berwyn. The terms of the agreement for operation are similar to those of the existing agreement between the Government, the stockholders of the Edmonton, Dunvegan and British Columbia and the Central Canada Railway Companies and the Union Bank of Canada, under which the properties of the two companies are operated by your Company. The cost of the construction of the extension is, of course, to be borne by the Province of Alberta.

10. As intimated in the last annual report your Directors entered into an agreement with the Province of Quebec for the construction by your subsidiary, the Interprovincial and James Bay Railway Company, of a railway

extending from Kipawa to the Des Quinze River, having a total mileage of approximately seventy-seven miles. The lease of the railways of that Company to your Company on the usual terms will be submitted for your approval.

11. Your Directors have authorized the preparation and erection of a bronze memorial statue to those in the Company's service who lost their lives in the Great War. The statue will be erected in the Windsor Station, Montreal, and replicas placed at Winnipeg and Vancouver. In addition, bronze plaques have been prepared for placing in the principal stations and offices of the Company from London to Hong Kong. Your Directors feel that the heroism, self sacrifice and high sense of duty which the Company's employees showed should be perpetuated in a prominent way throughout the System.

12. The death occurred on the 29th of November last at his home, Brocket Hall, Hatfield, Hertfordshire, of the Right Honorable Lord Mount Stephen, the first President of the Company in the ninety-third year of his age. Lord Mount Stephen was President from the incorporation of the Company in the year 1881 until August, 1888, and thereafter remained a director until May, 1893, when, finding himself unable to discharge the duties of a director to his own satisfaction owing to his absence from Canada, he retired from the Board. Lord Mount Stephen had been the master spirit of the enterprise from its beginning, and its safe conduct through its earlier perils to the strong and proud position it occupied when he retired from the Presidency was almost entirely due to his great ability, courage, tenacity and inspiring integrity. Your Directors recorded their appreciation of his services by a resolution upon the occasion of his retirement and as a memorial of the lasting benefit to the Company of his invaluable services have also recorded upon their Minutes a renewed expression of the Board's appreciation of that service, together with an expression of their profound regret at his removal by death.

13. The undermentioned Directors will retire from office at the approaching Annual Meeting. They are eligible for re-election:—

MR. J. K. L. ROSS,
RIGHT HON. LORD SHAUGHNESSY, K.C.V.O.
SIR THOMAS SKINNER, BART.

For the Directors,

E. W. BEATTY, *President*

MONTREAL, March 13th, 1922.

GENERAL BALANCE SHEET, DECEMBER 31ST, 1921

ASSETS

PROPERTY INVESTMENT:		
Railway, Rolling Stock Equipment and Lake and River Steamers		$597,206,336.77
OCEAN AND COASTAL STEAMSHIPS, Exhibit "A"		56,470,503.16
ACQUIRED SECURITIES (COST):		
Exhibit "B"		128,109,814.18
ADVANCES TO CONTROLLED PROPERTIES AND INSURANCE PREMIUMS		9,762,633.55
INVESTMENTS AND AVAILABLE RESOURCES: (Including amount held in trust for 6% Note Certificates, $60,155,819.31)		
Deferred Payments on Lands and Townsites	$69,296,736.90	
Imperial and Dominion Government Securities	27,310,674.54	
Provincial and Municipal Securities	2,016,721.29	
Debenture Stock in Treasury	7,000,000.00	
Miscellaneous Investments, Exhibit "C," Cost	38,356,459.66	
Assets in Lands and Properties, Exhibit "D"	91,962,630.15	
Cash	5,322,968.14	
		241,266,190.68
WORKING ASSETS:		
Material and Supplies on Hand	$32,997,116.59	
Agents' and Conductors' Balances	3,440,114.17	
Net Traffic Balances	860,757.79	
Imperial, Dominion and United States Governments, Accounts due for Transportation, etc.	1,681,377.24	
Miscellaneous Accounts Receivable	7,611,456.73	
Cash in Hand	45,318,948.06	
		91,909,770.58
		$1,124,725,248.92

LIABILITIES

CAPITAL STOCK:		
Ordinary Stock	$260,000,000.00	
Four Per cent. Preference Stock	80,681,921.12	
		$340,681,921.12
FOUR PER CENT. CONSOLIDATED DEBENTURE STOCK		238,206,431.68
MORTGAGE BONDS:		
Algoma Branch 1st Mortgage 5 per cent.		3,650,000.00
NOTE CERTIFICATES 6 PER CENT.		52,000,000.00
CURRENT:		
Audited Vouchers	9,406,442.66	
Pay Rolls	3,419,137.53	
Miscellaneous Accounts Payable	12,589,518.89	
		25,415,099.08
ACCRUED:		
Rentals of Leased Lines and Coupons on Mortgage Bonds		690,882.43
EQUIPMENT OBLIGATIONS		16,610,000.00
RESERVES AND APPROPRIATIONS:		
Equipment Replacement	10,780,419.91	
Steamship Replacement	19,185,401.96	
Reserve Fund for Contingencies and for Contingent Taxes	46,638,047.51	
		76,603,869.38
PREMIUM ON ORDINARY CAPITAL STOCK SOLD		45,000,000.00
NET PROCEEDS LANDS AND TOWNSITES		93,798,267.39
SURPLUS REVENUE FROM OPERATION		128,481,119.85
SPECIAL RESERVE TO MEET TAXES IMPOSED BY DOMINION GOVERNMENT		2,597,888.76
SURPLUS IN OTHER ASSETS		100,989,769.23
		$1,124,725,248.92

J. LESLIE, *Comptroller.*

AUDITORS' CERTIFICATE.

We have examined the Books and Records of the Canadian Pacific Railway Co. for the year ending December 31st, 1921, and having compared the annexed Balance Sheet and Income Account therewith, we certify that, in our opinion, the Balance Sheet is properly drawn up so as to show the true financial position of the Company at that date, and that the relative Income Account for the year is correct.

PRICE, WATERHOUSE & CO.,
Chartered Accountants (England)

Montreal, March 13th, 1922.

STATEMENT OF EARNINGS FOR THE YEAR ENDED DECEMBER 31ST, 1921.

From	Passengers	$41,565,884.99
"	Freight	128,849,445.63
"	Mails	2,939,258.56
"	Sleeping Cars, Express and Miscellaneous	19,667,265.22
	Total	$193,021,854.40

STATEMENT OF WORKING EXPENSES FOR THE YEAR ENDED DECEMBER 31ST, 1921.

Transportation Expenses	$73,557,749.11
Maintenance of Way and Structures	29,038,641.43
Maintenance of Equipment	36,746,816.45
Traffic Expenses	6,289,621.86
Parlor and Sleeping Car Expenses	2,271,391.04
Expenses of Lake and River Steamers	1,455,213.13
General Expenses (including all taxes)	9,460,681.07
Total	$158,820,114.09

DESCRIPTION OF FREIGHT FORWARDED.

		Years Ended December 31st		
		1919	1920	1921
Flour	Barrels	12,787,020	9,644,410	11,718,510
Grain	Bushels	121,059,921	172,536,485	175,506,119
Live Stock	Head	2,603,571	1,947,976	1,612,049
Lumber	Feet	3,143,431,200	3,565,175,867	2,382,570,398
Firewood	Cords	279,925	272,546	204,836
Manufactured Articles	Tons	7,854,163	9,330,111	6,853,857
All other articles	Tons	7,589,275	9,625,065	7,018,876

TRAIN TRAFFIC STATISTICS—FOR TWELVE MONTHS ENDED DECEMBER 31, 1921 AND 1920

EARNINGS OF LAKE AND RIVER STEAMERS AND OF KETTLE VALLEY RAILWAY NOT INCLUDED IN THIS STATEMENT

	Year ended December 31st, 1921	Year ended December 31st, 1920	Increase or Decrease: Amount or number	Increase or Decrease: Per Cent
TRAIN MILEAGE				
Passenger trains	18,931,622	20,538,038	—1,606,416	—7.82
Freight trains	18,828,421	24,335,581	—5,507,160	—22.63
Mixed trains	1,647,291	1,846,046	—198,755	—10.77
Total trains	39,407,334	46,719,665	—7,312,331	—15.65
CAR MILEAGE.				
Passenger.				
Coaches and P. D. and S. cars	94,803,210	105,591,004	—10,787,794	—10.22
Combination cars	2,551,439	2,416,844	134,595	5.57
Baggage, Mail and Express cars	45,035,660	48,243,553	—3,207,893	—6.65
Total Passenger cars	142,390,309	156,251,401	—13,861,092	—8.87
Freight.				
Loaded	439,278,916	591,151,172	—151,872,256	—25.69
Empty	198,371,578	209,037,450	—10,665,872	—5.10
Caboose	20,979,855	27,945,171	—6,965,316	—24.92
Total Freight cars	658,630,349	828,133,793	—169,503,444	—20.47

	Year ended December 31st, 1921	Year ended December 31st, 1920	Increase or Decrease Amount or number	Increase or Decrease Per Cent
Passenger cars per Traffic Train Mile	6.92	6.98	—.06	—.86
Freight cars per Traffic Train Mile	32.17	31.63	.54	1.71
PASSENGER TRAFFIC.				
Passengers carried (earning revenue)	15,186,081	16,769,555	—1,583,474	—9.44
Passengers carried (earning revenue) one mile	1,361,767,543	1,718,084,609	—356,317,066	—20.74
Passengers carried (earning revenue) one mile per mile of road	104,817	132,223	—27,406	—20.73
Average journey per passenger ....miles	89.67	102.45	—12.78	—12.47
Average amount received per passenger $	2.59	2.89	—.30	—10.38
Average amount received per passenger mile ....cts.	2.89	2.82	.07	—2.48
Average number of passengers per train mile	66.17	76.75	—10.58	—13.79
Average number of passengers per car mile	13.99	15.91	—1.92	—12.07
Revenue from passengers per passenger car mile ....cts.	40.46	44.88	—4.42	—9.85
Total passenger train earnings per train mile ....$	2.69	2.81	—.12	—4.27
Total passenger train earnings per mile of road ....$	4,265.71	4,844.78	—579.07	—11.95
FREIGHT TRAFFIC.				
Tons of revenue freight carried one mile	10,636,951,521	13,856,607,551	—3,219,656,030	—23.24
Tons of non-revenue freight carried one mile	1,487,724,058	1,830,407,240	—342,683,182	—18.72
Total tons (all classes) freight carried one mile	12,124,675,579	15,687,014,791	—3,562,339,212	—22.71
Tons of revenue freight carried one mile per mile of road	818,743	1,066,401	—247,658	—23.22
Tons of non-revenue freight carried one mile per mile of road	114,513	140,868	—26,355	—18.71
Total tons (all classes) freight carried one mile per mile of road	933,256	1,207,269	—274,013	—22.70
Average amount received per ton per mile of revenue freight ....cts.	1.196	1.038	.158	15.22
Average No. of tons of revenue freight per train mile	519.49	529.25	—9.76	—1.84
Average No. of tons of non-revenue freight per train mile	72.66	69.91	—2.75	—3.93
Average No. of tons of (all classes) freight per train mile	592.15	599.16	—7.01	—1.17
Average No. of tons of revenue freight per loaded car mile	24.21	23.44	.77	3.28
Average No. of tons of non-revenue freight per loaded car mile	3.39	3.10	.29	9.35
Average No. of tons of (all classes) freight per loaded car mile	27.60	26.54	1.06	3.99
Freight train earnings per loaded car mile cts.	28.95	24.34	4.61	18.94
Freight train earnings per train mile ....$	6.21	5.50	.71	12.91
Freight train earnings per mile of road ....$	9,789.44	11,072.83	—1,283.39	—11.59

[Advertisement]

Railway Officers

Financial, Legal and Accounting

H. E. Jarvis, an employee of the Chicago, Burlington & Quincy, since 1882, and assistant secretary of the corporation for the last 13 years, resigned March 9, on account of ill-health.

James A. Minor, assistant general land and tax agent of the Erie, has been appointed general land and tax agent with headquarters at New York, succeeding H. M. Andrews, deceased. **Kenneth Mayo** succeeds Mr. Minor as assistant general land and tax agent.

Operating

W. J. Etter, assistant to the operating vice-president of the Atchison, Topeka & Santa Fe, with headquarters at Chicago, has been appointed acting general manager of the Eastern lines, with headquarters at Topeka, Kan., effective April 1, to relieve F. C. Fox, on leave of absence.

D. F. Stevens, superintendent of the Baltimore & Ohio, with headquarters at New Castle Junction, Pa., has been appointed superintendent of the new Akron division with headquarters at Akron, Ohio, effective April 15. The Akron division is a consolidation of the Cleveland and New Castle divisions and will embrace 694 miles of line.

C. D. Baker, assistant general superintendent of the Long Island, with headquarters at Jamaica, Queensboro, New York City, has been appointed general superintendent, effective April 1, succeeding J. R. Savage, deceased. The positions occupied by **W. E. Canning,** superintendent in charge of freight transportation, and of **Ralph Peters, Jr.,** superintendent of passenger transportation, have been abolished. Mr. Canning has been appointed superintendent to perform the duties formerly assigned to the assistant general superintendent and Mr. Peters has been appointed assistant superintendent and his duties have been increased to include supervision over freight as well as passenger operations.

Mechanical

G. T. Depue, whose appointment as mechanical superintendent of the Ohio and Chicago regions of the Erie was announced in the *Railway Age* of March 25, page 806, was born December 2, 1872, at Hornell, N. Y., and was educated in the grammar schools of that city. On March 1, 1889, he entered the employ of the Erie as a machinist's apprentice. He afterwards worked as a machinist and extra gang foreman until March, 1901, when he was promoted to general foreman at Bradford, Pa. In August of the same year he became general foreman of the Hornell shops and in July, 1903, master mechanic at Hornell. In 1908 he was transferred in a similar capacity to Galion, Ohio. In August, 1913, he became shop superintendent at Galion and in 1916 was transferred in similar capacity to Susquehanna, Pa. At the termination of federal control he was appointed mechanical superintendent of the Chicago region and was appointed master mechanic at Marion upon the consolidation

G. T. Depue

of the mechanical departments of the Ohio and Chicago regions which took place in 1921.

J. R. Sexton will resume his former position as mechanical superintendent of the Northern District of the Atchison, Topeka & Santa Fe, with headquarters at La Junta, Colo., succeeding **E. E. Machovec,** acting mechanical superintendent, who has been assigned to other duties.

Traffic

C. R. Hartshorn has been appointed commercial agent of the Delaware, Lackawanna & Western, at Toledo, Ohio.

G. D. Brophy, district passenger agent of the Canadian Pacific, with headquarters at Banff, Alta., has been transferred to Regina, Sask., to succeed **J. A. McDonald,** transferred.

Eugene M. Peck, city passenger agent of the Chicago Great Western, at Kansas City, Mo., has been promoted to district passenger agent with the same headquarters, succeeding **Frank E. Hurless,** deceased.

Robert McDowell, traveling freight agent of the Southern Pacific, at Cincinnati, Ohio, has been promoted to general agent, with headquarters at the newly reopened Cleveland, Ohio, traffic office, effective April 1.

Engineering, Maintenance of Way and Signaling

G. W. Rear, general bridge inspector of the Southern Pacific, has been given the newly created title of engineer of bridges.

Obituary

Wendell H. Stillwell, supervisor of Safety and Fire Prevention of the Chicago, Rock Island & Pacific and formerly general superintendent of the Lines East, died suddenly at Rock Island, Ill., on March 28, at the age of 63.

F. J. Angier, superintendent of timber preservation of the Baltimore & Ohio, with headquarters at Baltimore, Md., died on the morning of March 24, at Mercer Hospital, Baltimore, from the effects of an operation for appendicitis. Mr. Angier was born December 22, 1866, at Beardstown, Ill., and entered railway service at the age of 16 as a roundhouse helper on the Chicago, Burlington & Quincy, at Aurora, Ill. On January, 1883, he was made a clerk in the mechanical and supply department at Beardstown, and he was appointed a clerk in the mechanical department at Ottumwa, Iowa, in December, 1893. In July, 1897, he entered the laboratory at Aurora, Ill., as a clerk and later as a chemist where he remained until September, 1898, when he was promoted to superintendent of the tie plant at Edgemont, S. D. He held this position at Edgemont and later at Sheridan, Wyo., when the plant was moved to the latter point, until 1908, when he was promoted to superintendent of timber preservation with headquarters at Galesburg, Ill. He left the service of the Chicago, Burlington & Quincy on May 1, 1910, to enter the employ of the Kettle River Company at St. Louis, where he remained until 1911, when he became superintendent of tie preservation on the Baltimore & Ohio, the duties of which position together with additional duties of inspecting all ties purchased by that road, Mr. Angier assumed until his death. Mr. Angier was secretary of the American Wood-Preservers' Association for 13 years, during which he was one of the most prominent factors in building up this organization. He was elected president of this organization at its convention in Chicago last January.

F. J. Angier

William T. McCulloch, auditor of revenue of the New York Central, died suddenly in Cleveland, Ohio, on March 23. Mr. McCulloch was born in Kittanning, Pennsylvania, in 1859. He began his railroad career with the Pittsburgh, Titusville & Buffalo (now a part of the Pennsylvania) as clerk at Oil City, Pennsylvania; later, in 1882, becoming traveling auditor of the Western New York & Pennsylvania (also a part of the Pennsylvania) and, in 1887, traveling auditor for the New York Central. From 1890 to May, 1891, he was assistant superintendent of the Western division. In May, 1891, he returned to the accounting department as assistant auditor of freight accounts and in March, 1899, became auditor of freight accounts. In 1910 he was appointed auditor of revenue, which position he held at the time of his death. As a member of the Railway Accounting Officers' Association, he was active in committee work. Mr. McCulloch resided in Haworth, New Jersey.

W. T. McCulloch

L. M. Sullivan, purchasing agent of the Texas & Pacific, with headquarters at Dallas, Texas, who died recently, was born at Denison, Texas, on August 29, 1891, and attended school at the Christian Brothers College, St. Louis, Mo., until 1907, when he entered railway service on the Ohio river and Columbus at Ripley, O., as ticket agent. The same year he became bookkeeper for the American Coal Company at Ripley but re-entered railway service shortly thereafter as an index and bill clerk on the Chicago, Rock Island & Pacific at Argenta, Ark. From December, 1908, to May, 1910, he was a stenographer in the chief dispatcher's office at El Reno, Okla., and later held various positions in the superintendent's office until the latter part of 1910, when he entered the service of the Cincinnati, Hamilton & Dayton, as a correspondence clerk in the engineering department. He was later promoted to secretary to the general superintendent and was subsequently made secretary to the assistant to the president at Cincinnati, O., where he remained until April, 1911, when he became a trainmaster's clerk on the Missouri, Oklahoma & Gulf at Calvin, Okla. Later in the same year he entered the employ of the Missouri Pacific as a stenographer in the office of the superintendent of transportation, from which he was later transferred to the office of the first vice-president. From November, 1911, to March, 1915, he was secretary to the vice-president; resigning in 1915 to become secretary to the first vice-president of the Texas & Pacific. From 1915 to October, 1916, he was chief clerk to the first vice-president and on the latter date was transferred to chief clerk to the receiver and the president. He held this position until his promotion to purchasing agent in 1920.

L. M. Sullivan